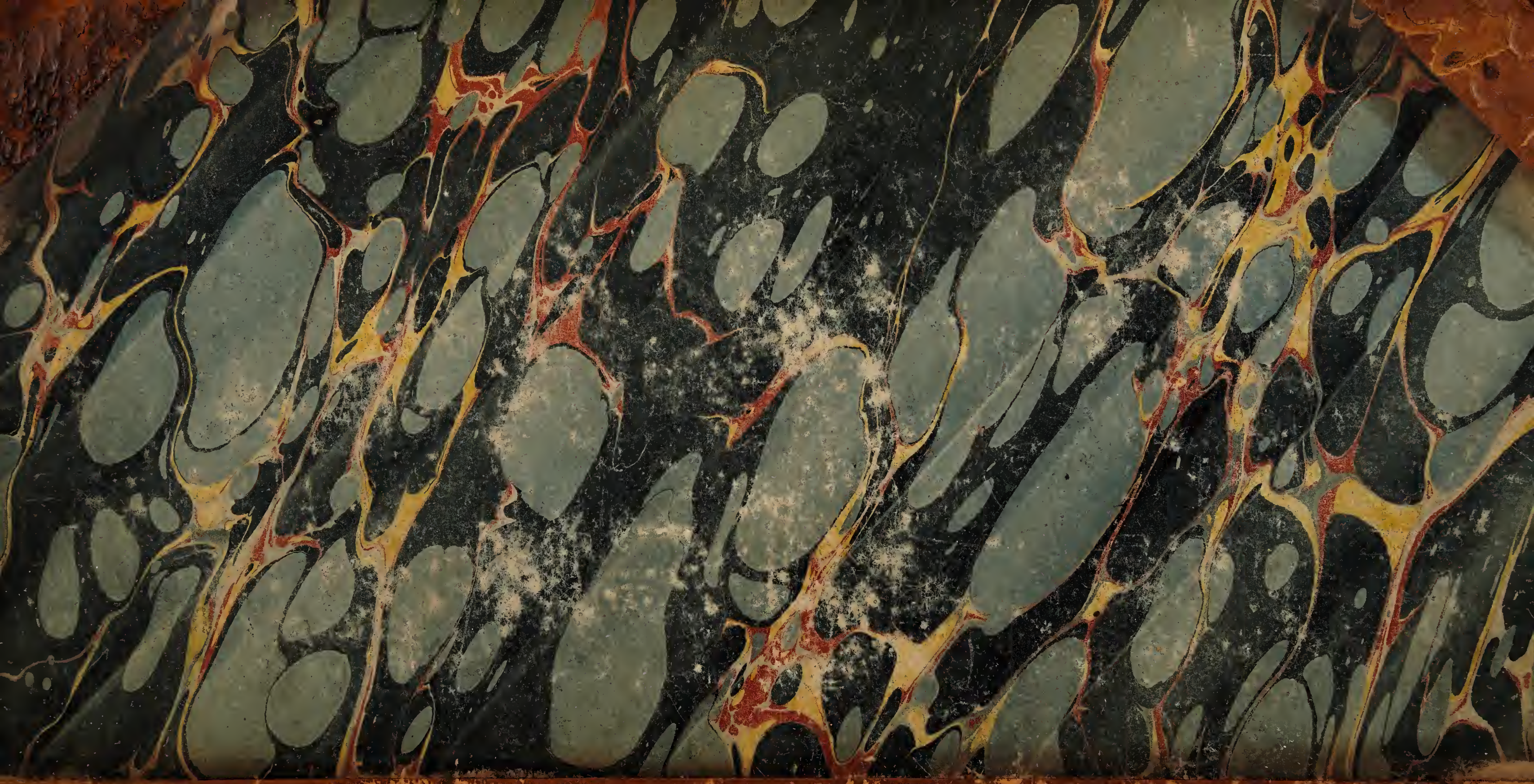

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EDITORS:

CHAPIN A. HARRIS, M. D., D. D. S.
AMOS WESTCOTT, M. D., D. D. S.
WILLIAM H. DWINELLE, D. D. S.

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ARTICLE I.

Observations on the Effects of Irritation upon the Deposition and Absorption of Dental Bone. Read before the American Society of Dental Surgeons, at their Eighth Annual Meeting, held at Saratoga, August 3, 1847, By W. H. Elliot, D. D. S.

In a paper we had the honor of reading before the Medico-Chirurgical Society of Montreal, on the 3d of April last, we discussed briefly among several subjects, some of the theories which have been offered in explanation of the mysterious phenomenon of the loss of the temporary fang, but as our remarks at that time, embraced several other subjects, we had not an opportunity of considering this one, as fully as we desired; we have, therefore, chosen it for the present occasion.

There is, perhaps, no subject connected with our own branch of the healing art, that has offered a broader field for speculation, or, that has elicited more conflicting opinions, than the shedding of the temporary teeth. We have often had our attention directed to the subject, and our curiosity awakened to know, why teeth of the same class frequently make their appearance earlier upon one side of the mouth, than upon the other, and why a similar but more striking irregularity, occurs in the

action of the absorbing vessels. Many writers have invented theories by which they can readily account for the loss of the first set of teeth, under ordinary circumstances, but, inasmuch as they do not account for the exceptions to these, their propositions cannot be received as correct. The irregularity with which this process is carried on, and its apparent dependence upon local causes, renders it more than probable, that the period of its occurrence is not in any way connected with constitutional influences; hence the necessity of fixing upon some theory, which shall explain it satisfactorily, under the various circumstances in which it appears.

In presenting our own views upon this subject, we are aware that we shall differ with men for whose opinions we have ever entertained the highest respect; we shall, therefore, submit them, with some hesitation, yet with a firm conviction of their truth.

Mr. Bell calls the shedding of the temporary teeth a process of anticipation, and believes that it is carried on independently of the necessities of the object for which the change is effected; or, in other words, that it is not the pushing forward of the permanent tooth, that causes the removal of the temporary root, but merely its presence is sufficient to produce it; but at the same time admits, that "it is not until the permanent tooth can no longer be retained in its own alveolus, that the process of absorption commences to open the required space." Now if this process be independent of the permanent tooth, why does it, under ordinary circumstances, always commence at that moment, when more room is required? Why is it carried on in the direction in which the tooth is inclined to grow, and why does it always cease with the growth of the tooth; these facts certainly favor the argument, that absorption is, to a very great degree, dependent upon the advancement of the permanent tooth. We have in our possession, the inferior jaw of an adult, which has the two wisdom teeth fully developed in its structure. These teeth lay horizontally in the jaw, with their grinding surfaces resting against the second molares, and their fangs extending under the *coronoid* processes. Over these

crowns, no absorption took place; but, according to Mr. Bell's theory, their presence should have been sufficient to open a passage, whether their natural growth pushed them in that direction or not. Yet this was not the case, nor is it ever the case when the tooth takes a horizontal position, therefore we think it cannot properly be called a process of anticipation.

Mr. Fox tells us that the absorption of the temporary fang, is induced by direct pressure of the permanent tooth upon it; but how can this be reconciled with the fact that dental structure contains no absorbents, and, consequently, when the tooth of replacement, comes in contact with the temporary one, absorption, by the direct action of vessels cannot take place, for the membrane which contained those vessels, is destroyed; for this reason it cannot, as he believes, be the result of direct pressure upon the substance of the fang.

There are cases in which a total destruction of the temporary fang, has taken place, while the tooth of replacement was yet confined to its bony follicle; and Mr. Fox himself, mentions this fact, as a conflicting argument to his own theory, without attempting to answer it. But we shall endeavor to show that absorption of the fangs of one tooth, may be induced by the irritation consequent upon the ulceration of another; and if we admit that the absorbents may be stimulated to action by irritation, we need not look far for an explanation of such cases, whenever we meet them.

The development of teeth in the solid structure of the jaw, affords abundant evidence, that absorption of the bone is not induced by actual contact of the growing tooth. When, by accident, the tooth is prevented from pushing forward through the gum, it remains imbedded in the jaw, and as it increases in length, by a deposition of dental bone from the pulp, the absorbents contained in the sac, or membrane which covers the pulp, carry away the jaw as fast as space is required for the newly formed fang. And so it continues to grow to precisely the same form and size, that it would, under the most favorable circumstances. It is evident that direct contact in this case, would not only prevent the excavation of the jaw, but it

would render the growth of the teeth impossible, for the organs which perform these two offices could not exist at all.

Dr. Goddard says, "the shedding of the temporary tooth, depends chiefly upon its death, produced by a loss of arterial supply. When the permanent tooth," says the same author, "impinges upon the end of the fang of its predecessor, it cuts off its supply of arterial blood, thus producing its death." To overturn this theory, we have but to mention a single fact, which is already well known to every one who has any experience in that branch of surgery, upon which, Dr. G. seems so anxious to enlighten us. The vessels of the tooth frequently remain entire, performing their natural functions in the crown, long after the fang has been absorbed, and thus they continue to carry their fluids to the remaining portion of the tooth, while every thing else about them is swept away by the process of absorption. Therefore, it cannot be true, that the destruction of the fang depends upon its death, by the loss of arterial supply.

We could not wish for this subject a more lucid examination, than it has already received at the hands of Dr. Harris. This gentleman's thorough knowledge of anatomy and physiology, has enabled him, in a most accurate manner, to follow out all the changes that occur in the parts concerned, but it is somewhat a matter of regret with us, that he has not offered his opinions on the cause of these changes under the many forms which they appear.

The agency of the carneous substance, discovered by Bourdet, in the removal of the temporary fang, is generally admitted, but that this tubercle is nothing more than an altered condition of the outer membrane of the dental sac, and peduncle, and that this change may take place in any part of this membrane, must also be admitted. The alveolo-dental periosteum of both sets, are also subject to the same change, and it always takes place to a certain degree, where irritation is most severe; the membrane first becomes more vascular, and as soon as absorption commences, it becomes thicker, and the absorbents are undoubtedly most active where this membrane is most vascular.

It has been urged in proof of the agency of this fleshy tuber-

cle in the removal of the temporary fang, that when it "fails to be developed, or is destroyed by an injurious operation, the tooth often remains in its socket, and does not make its appearance;" this may be true, but instead of sustaining the opinion that absorption cannot go on, without the assistance of the tubercle, it completely overturns it; for when the tooth of replacement cannot come forward, absorption must go on, to a still greater extent, so as to make room in the solid structure of the jaw, for the newly formed fang, and this is done without the assistance of the tubercle; therefore, we are bound to believe, that the change necessary to absorption, may take place in any part of the alveolo-dental periosteum, for "it is certainly unphilosophical to attribute a phenomenon to two distinct causes when one alone is sufficient for its explanation."

Some writers have favored the opinion that the vessels of the sac, exhale a dissolving fluid, which decomposes the temporary fang, and thus it is readily carried away by the absorbents, but the fact that we sometimes find portions of the membrane adhering firmly to the eroded surface of the fang, renders the matter doubtful; besides we do not recollect having seen upon the enamel of a tooth of replacement, anything like the effects of a solvent, though cases often occur in which the permanent tooth must have been freely bathed in that fluid, if it has existence.

Many other theories have been advanced for the explanation of the peculiar process, by which nature removes the first set of teeth, but none of them furnish that evidence of truth, which a correct theory should do. They do not account for exceptions as well as general rules.

For the purpose of illustrating our own views on this subject, we shall mention one out of many cases which have come under our notice.

During the fall of 1844, Mrs. G. called on us with her little daughter, who was suffering from alveolar abscess over the root of the right superior central incisor of the temporary set. The crown of this tooth was entirely destroyed by caries, and the root was rendered so sensitive by the existing inflammation, that we

were unable to effect its removal in its present state, we, therefore, scarified the gum, and sent her away with directions to call again when the inflammation had subsided. This, however, she neglected to do for more than a year, during which time she had several attacks of periosteal inflammation; and when she did call, absorption of the gum had taken place to such an extent, that the fang was exposed its whole length, we removed it, and on finding the left central incisor loose, we removed that also, and to our surprise, we found that the root of this tooth was entirely absorbed, while the root of the diseased one was whole. In a few weeks after, the right central incisor of replacement cut the gum, and when we last saw our little patient, the crown of this tooth was entirely through, beautifully and perfectly formed; but the eruption of the left permanent incisor had not then taken place.

Now if the case of which we have just given a brief history, were an unusual one, it would mean nothing, but as all the circumstances connected with it are of common occurrence, we may safely draw from it the following inferences:

1st. That an increased but healthy deposit of dental structure, may be produced by local irritation.

2d. That absorption of dental structure may be induced by local irritation.

And, lastly—If the absorbents become too deeply involved in the disease, their operations will be entirely interrupted, and the root, which it was their office to remove, will remain whole.

Premising that the innate constitution be good, and that the blood bear a proper proportion of the earthy salts and gelatine, may it not be fair to suppose that if a larger amount of these materials be brought to the secretory organs, through the circulation, that they, in obedience to this impulse, will be stimulated to greater activity, and thereby advance the natural growth of the tooth.

The absorbents, when active, are always enlarged, upon this ground may we not make the deduction fairly, that they are always active when enlarged by the stimulating influence of local irritation, or, in other words, when enlarged by healthy ac-

tion. If so, those circumstances in the case mentioned, which gave rise to our second conclusion, are explained.

Cases exhibiting the effects of irritation upon the absorbents, are met with in almost every young patient, so that those who desire an opportunity of testing our theory, need not wait long for it. The fact, that the temporary fang is sometimes absorbed before the carneous substance has reached it, is evidence that its own periosteum must contain absorbents capable of removing it; then we have only to provide these vessels with a stimulant, and they will at once attack every thing in contact with them. That a slight degree of irritation will increase their size and render them active, will, we trust, be admitted when a few examinations have been made. In making these inquiries, it should be remembered that the same amount of irritations, owing to certain constitutional tendencies, will not have the same effect upon the absorbents in all cases. That the destruction of a tooth by caries, and its final removal at an early period, though it may have produced considerable irritation, would not exhibit any outward signs of an increased deposit of dental bone upon the permanent pulp; and the filling up of the temporary alveolus, would retard the progress of the tooth of replacement, more than enough to counterbalance the influence of any previous inflammation. Ulceration of a temporary tooth might destroy the peduncle, and a portion of the sac of its successor, and thereby prevent it from making its appearance at all. But these, and many other circumstances, which may seem to furnish arguments against our conclusions, may readily be explained.

In consideration of the various phenomena of absorption in the buccal cavity, we are induced to believe that its immediate causes, in young subjects particularly, are entirely local, and in no way connected with constitutional influences. Admitting that irritation, or inflammation, in one portion of the jaw may stimulate a greater degree of activity, the absorbents in a neighboring part, and we at once remove the stumbling-block over which nearly all former theories have fallen.

In the shedding of the temporary teeth, absorption is always the

result of irritation produced as a general thing, by the pushing forward of the tooth of replacement, though we have abundant evidence that it may be produced by causes more remote. In alveolar abscess, the absorption of this process is the effect of irritation resulting from a decomposition of the nervous pulp. In regulating the teeth of children, the absorption of the alveolus is produced by pressure upon its periosteum. The irritation arising from salivary calculus, badly constructed artificial teeth, &c. frequently cause absorption of the gums and jaw to such an extent that the teeth fall out; and in all these cases the appearance of the alveolo-dental periosteum is the same, that is, it becomes thickened and more vascular.

In conclusion, we have only to remark, that we have found it much easier to demolish the theories of others, than to render our own invulnerable, and though each new inquiry still confirms our belief, yet in submitting it to the examination of a tribunal from whose decision there is no appeal, and to whom so many writers have looked in vain for a confirmation of their opinions on this subject, we are prepared to see it set aside for one more rational; and, whether our exertions result in the establishment of our own theory, or the discovery of the true one, we shall be equally gratified.

MANCHESTER MEDICAL SOCIETY

ARTICLE II.

The Teeth, with Respect to the Voice. By A. HILL, D. D. S.

"No man liveth to himself"—is a truth not merely attested by revelation, but confirmed by universal observation and experience. The habits of society—all human governments and laws, together with the relations and responsibilities growing out of them, all combine to establish this truth. But these evidences, are not more conclusive and irrefragable in relation to the above named proposition, than are those which go to prove the close and intimate relation subsisting between the teeth and

the other distinct organs of the human body. Groups and congeries of organs, associated together for the accomplishment of certain specific objects, may sustain a relation to the whole, similar in character to that which is represented by *families* and *neighborhoods*. Others, again, to that which subsists between *states* of the same confederacy, and others to the *supreme government* under which they live. The *head*, the *limbs*, and the *trunk*, are all related to each other, and the different organs or parts of each are the instruments of the whole.

We mention not these things, with a view to instruct the physiologist, who so *well* knows the truth of what we state, or with a view to claim originality of thought in this respect; but for the purpose, simply, of refreshing his memory, and to deduce certain conclusions and facts, which we design to spread before the readers of the Journal. And surely nothing can be more interesting to the student of physiology, than to trace the remarkable phenomena, exhibited by this wonderful machine, in its combined and curious relations. And this interest is greatly enhanced, as we are enabled, from time to time, to trace some of those relations, not merely as they exist between different organs in the performance of animal functions alone, but in their higher modes of manifestation, especially, when they become the vehicles of thought, and language, or instruments, through which the soul of man displays itself in a most wonderful manner. The faculty of speech in man, and the intelligence which prompts to the exercise of articulate sounds in communication with his fellow, are his crowning glory. No attribute of humanity is more distinctive—none more remarkable. Around it clusters every thought, and every feeling of the human soul, and it displays, like a faithful microcosm, the intellectual world in miniature. These considerations alone, it seems to us, are sufficient to invest this subject with singular importance, and to justify the effort which we make, to show the relation, which the teeth sustain to *speech* and *elocution*.

The exercise of the vocal organs in man, is so intimately connected with the dental apparatus, and the powerful influence which the latter exerts over the former, especially in the use of

articulate sounds, is so great, that it becomes somewhat marvellous that the attention of physiologists, and elocutionists, should have been so long withheld from it. But as dental science advances, we hope the time is not far distant, when its legitimate claims to importance in this, as well as many other respects, will be not only felt and appreciated, but acknowledged as it deserves, and of right ought to be.

That the perfection of speech, and the absolute command of the voice, is a desirable attainment—nay, more—a splendid accomplishment, no one will deny. To feel its magic power, or to be brought within the circle of its charm, we have not to go back to the palmy days of Greece and Rome, and listen with the wrapt throng that clusters, in breathless attention, around those orators of world-wide fame. For our own senate halls echo, and our own pulpits and hill-sides reverberate as fine specimens of elocution as ever broke its ravishing music upon the ear of mortals. And where is the human soul, clothed in fleshy habiliments, that has not, at some time, felt its mighty influence, and bowed before it as the stubborn oak bows before the gale. To master this elegant art the young man has labored in the cloistered-hall, and in the open field—has declaimed before his school-fellows and his college professor—and where one is successful, a thousand are disappointed and chagrined. Volumes have been written upon the subject—professorships have been established to teach it, and thousands of dollars expended to gain it: and disappointment has so often followed, that many have come to the *unfortunate* conclusion, that it is an endowment, or attribute of genius alone, and altogether unattainable to those who can boast of no extraordinary qualifications, or almost supernatural endowments.

But this, we take occasion to say, is a great mistake, and any individual, with *good natural powers*, (and by this we mean nothing more nor less than a healthy and normal condition of the organs concerned,) and ordinary capabilities, can cultivate it successfully. Nor are we alone in maintaining this opinion, for many successful teachers avouch the same thing. But as we design to be brief on this part of the subject, we will be

content in citing the language of an able and interesting writer upon this point. Says Prof. Caldwell, "distinctness of articulation, and a clear and perfect enunciation, can rarely be said to depend upon nature at all, so entirely are they the result of education." And yet every one must perceive, that in proportion as there are physical obstacles in the way, just in that proportion, will it become a difficult acquirement, and the chances of success be proportionably diminished. But Prof. Caldwell evidently refers to those cases where all the parts concerned are simply normal, and is contending against the notion, that some *extraordinary* qualification is necessary, to cultivate, successfully, this elegant accomplishment. That the peculiar condition of the mouth and dental organs, in many individuals is a serious obstacle in the acquisition of this art, and in others, quite insurmountable, is a position which we now assume, and shall attempt to prove.

The experience and observation of every thinking man may be called to our aid in support of this position. For it cannot have escaped them, that many individuals of profound intellects and brilliant parts, make but a sorry figure in their fruitless attempts at oratory and elocution. Every one who has had experience in regard to matters of this kind, must have been conscious of great disappointment, in not realising his expectations in regard to certain distinguished men with whose writings he has long been familiar. Having fancied to himself, that because they could wield a pen so successfully, they must, therefore, be accomplished speakers, and finding himself sadly mistaken, is at a loss to account for a circumstance so strange, and apparently contradictory. But where lies the difficulty? Certainly not on the score of intellect, for their acquirements are demonstrable from their writings, which evince great strength—rigid discipline—extensive scope, and brilliancy of thought. Nor is it because they have never enjoyed the advantages of tuition, for they are fresh from the schools where elocution is taught. What, then, is the obstacle? We answer—it is to be found, in the peculiar conformation of the mouth, and the wretched condition of the teeth, giving rise to impediments and difficulties,

which constitute their misfortune, and of which they are most painfully conscious.

Here, for instance, is one, whose palatine arch is greatly contracted, forming, nearly, an acute angle in front, and projecting in an unsightly manner, far beyond the circle of the inferior maxillary. The superior front teeth stand outward, while the inferior front teeth stand inward. And the only teeth that antagonise at all, are the first and second molares, so, that when the mouth is as firmly closed as it is possible to be, you can place your two fingers between the front incisores, and he cannot bite you, to save his life. The lips, if closed at all, are drawn up so as to resemble a lady's "work-bag," or reticule, and the whole, giving an expression of countenance, somewhat resembling the *Rodentia* class of animals, to which belong the rat and the squirrel.

And now I ask, did a man ever hear perfect language, from such a mouth? It matters not what his abilities may be, or his other advanges have been. His intellect may be as brilliant as that of a seraph, and yet his language will fall in murdered notes, and sounds come up from the *larynx*, in deep-toned gutturals, that never fail to fall harshly and disagreeably upon the ear of every listener.

Give him every advantage of education—place him under the tuition of the greatest elocutionist of the age, and what can he do? Place him behind the bar as a barrister, or in the pulpit as a preacher, and he still finds an insuperable barrier to the accomplishment of his purpose. He may be the cherished object of his parent's ambition—the individual, for whose education, a fortune has been expended—the object of interest to a large circle of friends, and yet it will avail him nothing, so long as he withholds from the dental surgeon the fee, which is so obviously his due. And his unsightly mouth, will stand out to the world as a monument of this indebtedness, wherever he goes.

It may be thought, by some reader of the Journal, that we have taken an extreme case. Perhaps we have. Yet we contend, and shall endeavor to show, that *every* departure from a

perfect denture or the most complete development of the parts concerned, is, *insomuch*, an obstacle in the acquirement of perfect elocution. But in order to a more comprehensive view of this subject, it becomes necessary to take a more minute observation of the structure and relative situation of the vocal organs, and the parts adjacent to them. This then we shall endeavor to do.

At the root of the tongue, lies a minute, semi-lunar shaped bone, which, from its resemblance to the Greek letter *v*, or upsilon, is called the hyoid, or u-like bone. Immediately from this bone, arises a long cartilaginous tube, which extends to the lungs, and conveys the air backwards, and forwards, in the process of respiration. This tube, is the *trachea*. The upper part of it, or that immediately connected with the hyoid bone, is the *larynx*. This is formed of five distinct cartilages—the largest, and apparently, though not really, the lowermost of which produces that acute projection, or knot in the neck of males, usually called "Adams-apple." This is not a complete ring, but is open behind; the open space, being filled up, in order to make a complete ring, with two other cartilages of a smaller size and power; and which, together form the *glottis*, or aperture, and closes it in the act of swallowing so as to direct the food to the *œsophagus*, another opening, which leads to the stomach. These four cartilages are supported by a fifth, which constitutes their basis; and is narrow before, and broad behind, and has some resemblance to a seal-ring.

The *larynx* is contracted and dilated in a variety of ways by the antagonist power of different muscles, and the elasticity of its cartilaginous coats; and is covered over with a very sensible and vascular membrane, *which is a continuation of the mucous membrane of the mouth.*"*

The organ of the voice, therefore, is the larynx, its muscles, and other appendages. And the voice, itself, is the sound of the air propelled through, and striking against, the side of its glottis. And this sound is modified and varied by the least

* Vide Good's Study of Medicine.

change in the organ, or the slightest contraction of its muscles. And the shrillness or roughness of the voice, depends on the internal diameter of the glottis, its *elasticity*, *mobility*, and *lubricity ;* and the force with which the air is protruded. Now, will any man contend for a moment, that the condition of the teeth and gums have nothing to do with the *elasticity*, *mobility* and *lubricity*, of the parts here under consideration ? or, the diameter of the larynx itself? We think not; especially when they consider that the very *sensible* and *highly vascular* membrane which lines these organs, is but a continuation of the mucous membrane of the mouth. Nor will the intelligent dental surgeon fail to see, that the inflammation which is so often consequent on a diseased condition of the teeth, and their ulcerated fangs, may easily, nay, often does extend itself, not only along the maxillary arch, but to the fauces, the velum, the tonsil glands, and larynx, kindling up a violent disease in its track, coating the tongue with a heavy fur, and rendering every effort to speak painful, and difficult. Under such circumstances, the voice is husky, and unpleasant. The vessels of the mucous membrane are gorged with blood, the muscles, upon whose movement so much depends, become rigid, and inflexible ; and the salivary glands, discharge an unhealthy secretion, which, instead of lubricating the parts, serve but to clog, and impede their action. And we say, just in proportion, to the violence of this diseased action, will be the difficulty to which we allude. As a general thing, the condition of the gums, depend upon the circumstances of the teeth. Although it sometimes is so, that the constitutional health of an individual, may very materially effect the condition of the gums. There are thousands of cases, where the teeth are so denuded, and worn down by caries, as to present to the eye of the observer, a continuation of inflamed surface, as far as the eye can extend about the throat and fauces ; and that too, when the individuals themselves, can scarcely be made to believe that any especial care, or attention is demanded. This sub-acute inflammation, extending as it often does, to the trachea and larynx, cannot fail to modify, and in some measure, control their action, and as a necessary conse-

quence, effect the modulations, and inflexions of the voice. And the extent of those circumstances of the mouth to which we here refer, is well known, to every practitioner of dental surgery, who has been a few years, in the exercise of his profession. Independent of this, there is another source of difficulty, originating in the loss of the dental organs. We must perceive, that from the very nature of the vocal organs, and the nature of sound, that the former are easily effected, and the latter as easily modified. And that the perfection of the human voice, depends upon the perfection of the vocal organs, while the modulations of voice, (in which elocution consists,) is dependent upon the form of the mouth, and condition of the teeth and parts, with which they are immediately connected. Now suppose that the larynx, the trachea, the lungs, diaphragm, and abdominal muscles, are all healthy and perfect, but, that the individual has a cleft palate, can *he* exercise his vocal organs successfully without artificial assistance? Again, suppose that his palate is sound and healthy, but, there is a sad mal-formation of the maxillary arches, like the one before mentioned, is it not obvious to every one, that this too, must constitute a very serious impediment to the perfect articulation of sound, as used in speech or language?

But even allowing, that the parts are well formed, and well developed, and that the only difficulty consists in the loss of one or more teeth, even this will present a difficulty to the easy, graceful and perfect enunciation of language, by no means trifling, or insignificant.

A circumstance, illustrative of this point occurred a few years since, in our own practice. The Rev. Mr. S. was deeply afflicted with a diseased bicuspid, situated on the right side of the superior maxillary. He called at our office for relief, we advised its extraction, and it was accordingly removed. On the following Sabbath, while engaged in the performance of divine service, he became so much annoyed by the loss of that tooth, and so difficult was his enunciation, that he was compelled to stop, in the midst of his discourse, and explain the cause of his difficulty, to his congregation. And this the loss

of a single tooth. But what must be the inconvenience, where there is scarcely a perfect tooth remaining, where ragged edges of decayed teeth, fret, and lacerate the tongue, and where dead roots, and ulcerated fangs, render the parts inflamed, and exceedingly irritable. In such cases, the air comes rushing through the trachea into the larynx, through the larynx into the fauces, it is there held in abeyance by the tongue and muscular coats of the mouth, until it can be modulated into proper sounds; but the tongue, in its effort to do this, encounters difficulties hard to appreciate, and stubborn to subdue. Overleaping its natural province, having no teeth to restrain and circumscribe its movements, it murders the very sounds it would fain control, and gives birth to notes, the most discordant and unmusical. Nature's own beautiful barricade is broken down, and the voice comes hissing through the crevices, and dilapidated walls, somewhat as the storm-spirit howls through the dilapidated apartments of an old building. How different all this, from that rich sonorous language, that falls so gracefully, in measured notes, from the lips of one whose broad expanded mouth and well developed teeth, enables him to mould his voice, in sounds the most mellifluous and delightful. No squeaking of the voice, no hissing of the air, no unnatural contortion of the muscles of the mouth to accommodate it to its unnatural circumstances; giving rise to habits that are as painful to the individual, as they are unpleasant and disagreeable to others. Such a mouth has Henry Clay of Kentucky, such a mouth had Patrick Henry, and such a mouth had Daniel O'Connell. Indeed, it is quite impossible to call to mind a single renowned orator who does not in the main, possess these physical characteristics. Who ever heard of *one* with a small, contracted mouth, shaped like that of the rat or squirrel? Either such a mouth or face, are seldom associated with great thoughts, much less with elegant language. Speaking of Henry Clay, we well remember, that his *mouth* has been the subject of frequent remark; and many amusing anecdotes, of his peculiar expression of countenance, connected with the expansion of his mouth, when engaged in debate, have been related of him.

And there can be no question, but that he is much indebted to his mouth, and the peculiar play of his features, for his great success in oratory. The lingering playful smile, the biting sarcasm—the expression of supreme contempt—the supercilious curl of the lip—the silver accents of his voice—the delightful enunciation—the elegant diction—all, all, are much more than appears to a superficial observer, dependent on a perfect denture. The loss of the front inferior incisores, more especially, gives rise to difficulty, in the articulation of language. To be satisfied of this, says Dr. Robinson, (see Robinson on the Teeth, p. 163,) you have only to pronounce, distinctly, some such words as the following, "*this*," "*therefore*," "*they*," "*those*," or "*that*," and you will immediately perceive the vibratory action of the tongue, on these teeth. The absence of these teeth, it must be perceived, would allow the air to escape, and thus produce a lisping sound that greatly mars the beauty, and force of language. That the force and strength of habit, may overcome many difficulties I am prepared to admit, and that the mouth will accommodate itself to circumstances in the formation of sounds, to a certain extent, I will also allow, but in doing this, it often gives rise to other evils of equal, if not greater magnitude. In a public speaker, disagreeable habits greatly detract from his effectiveness. Various contortions of the mouth and face, produced by the effort to accommodate itself to the loss of the teeth, often occasions disagreeable sensations in the hearer, and results, in a loss of sympathy between the speaker and his hearers, which sympathy is very necessary, to render public speaking effective, and useful. So comical and ludicrous, are these expressions of the countenance at times, that

"To be grave, exceeds all power of face."

To see a man shape his lips, to fit a word, and struggle to expel it, as if he had something disagreeable in his mouth, and was about to strangle under its influence, is always painful, and laborious. And we are often reminded of a story, told by a facetious and witty friend, of a certain shrewd Yankee, who,

finding himself in the western country, in rather destitute circumstances, hit upon an expedient to "raise the wind," by teaching a *whistling* school. Having assembled his pupils, and arranged them in regular order, he told them, the first thing was, to "prepare to pucker."—So it is very frequently, with this class of speakers, the peculiar circumstances of their mouths, require of them, that they "prepare to pucker."—And hence it is, that you will often see them, with their lips compressed nearly two-thirds their length, and opening in one corner, like the mouth of a trumpet, expelling their words through that opening, in the most laborious manner. And these habits, which are so easily contracted, generally remain through life. In almost all cases, they are referable, either to a crowded condition of the teeth, and consequent irregularity, or to a loss of one or more of these important organs.

There is another consideration, which gives additional importance to the dental organs, in connection with the subject of elocution. It is considered at some length in Dr. Robinson's very excellent work on the teeth, above referred to; and to that work we refer the reader, who may be curious to see the Doctor's reasoning upon that subject. It is the circumstance of the teeth's being in a modified sense, organs of hearing, or rather, conductors of sound; giving to the individual, in some degree, an appreciation of the sound of his own voice, which is so essential to its modulation.

What we have said in relation to the teeth, as being so important in the exercise of articulate language, or speech, is equally true of the vocal organs, when employed in singing, and of the teeth, in respect to song. The same difficulties originate in the one case, as in the other. The voice is modulated, and all its delicate inflexions in a great measure controlled by the circumstances of which we have been speaking, and we know not that it is necessary to consume any more time, in attempting to illustrate this part of our subject. Suffice it to say, that with the same difficulties existing in regard to the teeth, gums, and buccal cavity as above referred to, our efforts at song, will be equally unsuccessful, and abortive, and productive of the same unpleasant habits, and disagreeable contortions.

And here, if we mistake not, we have the source and origin of those disagreeable habits, into which so many thousands of our race have fallen, and which have been so productive of evil to a very large number of clergymen, and others engaged in public speaking. Resulting in diseases of the throat, of a most painful and afflicting character, and not unfrequently, the entire use of the voice, has been lost, from such diseases of the vocal organs. *Bronchitis*, *laryngitis* and *phthisis-pulmonalis*, are the scourge of public speakers of the present day, and in our humble judgment, they are almost uniformly the result of circumstances to which we have alluded. The premature decay, and loss of the teeth, and the diseases of the mouth and throat resulting therefrom, and those malformations of the mouth and jaws, which are mainly the result of neglect, or mismanagement during the process of dentition, must, of necessity, make the use of language, hard and laborious. The parts are absolutely twisted out of their natural relations, and every use of them under such circumstances becomes a strain, which is sure to result in disease. For the necessary sounds cannot be formed, unless the parts are accommodated, and the effort to do this, brings them into a relation to each other, which is forced and unnatural. The muscles of the throat and larynx, are overtaxed in the performance of their office, and not being able continually to maintain the necessary degree of tension, they become relaxed, flaccid, and inflamed. And, as a natural consequence, the voice becomes husky and unpleasant, and of course, every succeeding effort only aggravates the difficulty. The irritation thus produced about the larynx and trachea, induces a cough, and the afflicted patient runs down with consumption. And thus it is, that thousands of our most useful men are cut off, in the very prime of life, and the zenith of their bright career.

And now, if the view which we have taken of this subject be correct, (and whether correct or not, we are deeply impressed with its importance,) it must certainly furnish some considerations, which are worthy the attention, not only of the dental surgeon, but of the physiologist and medical practitioner, who are so frequently called upon to treat such cases as these.

From all we have written upon this subject, we think it must be obvious to every intelligent reader, that the duties of the dental surgeon, are neither mean, or unimportant, as he must necessarily hold, in the exercise of his profession, the absolute destiny of many of his race. The germ of future greatness, in his infant patient, may be entirely crushed, or developed under his hands, and the hope, and expectation of parental ambition and fondness blasted forever, or fully realized. The pulpit and the altar—the bar and the forum, are alike dependent upon him, for their highest, and brightest ornaments, and if he will, he may cheat the sexton and the grave-yard of many a victim.

Again, in view of this subject, how reprehensible is the conduct of many parents, who, while they are lavishing thousands of dollars upon their children, in order to give them a "*fashionable*" education, at the same time withhold, or grudgingly bestow, the insignificant fee required by the dentist. And who, if they employ him at all, are sure to seek out one, who will do his work the "*cheapest*," irrespective of his qualifications. Bestowing thousands where it is not needed, nay, worse than that, where it is directly hurtful, and withholding it, where it is most essential. Such parents are unworthy to have the care of children, for they literally, "know not what they do."

That our useful art possesses resources that are not yet developed, especially to the extent of which they are capable, is perfectly obvious. We trust the time is not far distant, when these resources will be acknowledged and appreciated as they deserve to be. Who questions the propriety of a teacher of elocution in our colleges and public schools? And yet, *who* supposes that an accomplished dental surgeon is *much more* necessary. And without whose services, the professor of elocution may labor till "dooms-day," with very little result, which is in any degree satisfactory. Also, in our numerous female seminaries, and common schools, where music becomes an important part of education, the same thing is eqally true, equally important; more so, indeed, for

"Just as the twig is bent, the tree is inclined."

And as there is no period of life, in which the services of the dental surgeon is so necessary, as in youth, so there is no period, when they are so fruitful of good to the patient.

ARTICLE III.

Extraction of Teeth. By J. LEE, M. D., Camden, S. C.

THE successful extraction of teeth depends much on the manual dexterity of the operator, yet without anatomical knowledge he will often fail, or be compelled to resort to brute force.

The best instrument in the hands of an operator is the one in the use of which he is fully instructed—it is, therefore, of great importance that he should learn with good instruments. I have been in the habit of extracting teeth for twenty-five years, and have used every variety of instrument.

In the office in which I studied medicine, we had a variety of keys and forceps, illy adapted to taking hold, or holding when put on. It would be useless to describe the keys, as they were badly constructed—with revolving fulcrums—spring-triggers—snaps, &c. &c. I found among the discarded instruments the shank of a key slightly bent at the fulcrum—the fulcrum being round, half inch long, three-eighths thick; to this I fitted a handle and a set of claws—it soon became the favorite of the office in preference to others of greater pretensions. While in the practice of medicine, (which includes tooth-pulling in the country,) I used a similar key made for me by Schively of Philadelphia, and which key I yet have; to it I added an India-rubber pad, on a movable button, which I think an improvement.

I used the key many years to extract the molar teeth of both jaws, and if the claw is adapted to the size of the tooth, reasonable success may be expected with it; if the claw is too large the fulcrum will slip down, and the traction will be against the rise of the tooth, it being drawn laterally, so that

the alveolus must give way or the tooth be broken off. If the claw is too small the effect will be to snap off the tooth at its neck. But if the claw is of the right size so as to have the edge of the claw horizontally opposite the fulcrum when tightened in the tooth, the fulcrum being adjusted to the palatine side of the upper molar, it will readily follow the revolution of the instrument. In the extraction of a lower molar with the key, the fulcrum should be placed on the labial side of the jaw, and as I am here running against the received notions on this subject, I give the following reasons: The anatomical construction of the lower jaw favors the slipping down of the fulcrum on the inside—the outside widens so as to support it; the inside of the jaw is weak, the outside strong—the inside is liable to splinter, the outside never splinters. From the outside, I think the force required to extract is one-third less, and this I have proved to my satisfaction by drawing similar teeth from the same jaw at the same sitting. The inclination of the teeth inwards, and the outer edge of the jaw being a little highest, favors the rotation outward.

Some ten years since, I came into possession of a set of Cartwright's forceps, or Snell's as they are improperly called, for Snell himself calls them Cartwright's—with these I succeeded so well that I discontinued the use of the key on the upper jaw, but still preferred it in extracting the lower molars. In 1846, I received a pair of molar forceps from Philadelphia, which were an improvement on Cartwright's, claimed by Dr. Harris—they were sent to me by Mr. Charles Abbey. Their great size caused me to lay them by, but meeting with some cases to which I thought they were fitted, I tried them, and since that time I have regarded them as the most valuable extracting instruments in my case, they having superseded the key in the extraction of the lower molars.

Previous to the extraction of a tooth, the gum should be separated from it by a narrow slightly curved lancet—whether you cut up or down is a matter of little consequence, so you completely cut round and down to the bone.

To extract an upper molar with a key, place the patient on a

low seat, and stand or set behind him—for the lower, stand before or by the side of the patient—turn the upper teeth inwards, the lower outwards for the molars, the bicuspids of both jaws to be turned inwards. The sapientiæ, generally, from their position, and for want of room require to be turned inwards—but where practicable, they are easiest removed outwardly. The cuspidati and incisores are removed by forceps—those of the lower jaw require to be pressed outward and inward before direct traction is applied—the uppers require a little rotation before traction. Any good pair of forceps, the beaks of which are fitted to the slopes of the teeth may be used. My prejudices are in favor of those manufactured by Mr. Arnold of Baltimore.

All roots, or decaying teeth, causing inflammation of the gums should be removed. Some teeth, apparently past use, will, after killing the nerve, and being filled with tin, cease to be offensive, and last several years. In such teeth I prefer tin to gold, and if asked why, I answer, that ten years experience satisfies me that it is better.

But we find in some mouths the roots of teeth even with the gums, clean and healthy, useful as a chewing surface. Such roots I do not extract—they are useful in keeping the countenance full. They should be extracted previous to setting artificial teeth.

In extracting with the key or forceps, with ordinary care, it is scarcely possible to extract several teeth at once. By permitting the claw to grasp two teeth, or where two are standing together, those before and behind having been previously removed, the alveolus may give way and two come out together.

Miss P. requested a physician to extract the second molar, the first having been removed sometime previous—the alveolus gave way, and the sapientiæ came away with it, a considerable dimple in the cheek was the consequence.

Sometimes the roots of the teeth are united by exostosis, but this is rare—I have seen one case—here two teeth came away when pulling one. It was a case of Dr. T. J. Flinn's, of Darlington, S. C., and is similar to a case published by Dr. Harris. Exostosis, sometimes, renders teeth difficult to extract, having

the effect of rivetting them in their sockets—the ends of the fangs being increased double or triple their natural size. I extracted the first upper molar from the jaw of a delicate woman—two of the roots, after complete separation, united at their joints. I have extracted many, which seeming to have reached the anterior, turned horizontally, but only one in which a complete bony union had taken place without apparent exostosis.

Exostosis rarely if ever occurs on the roots of teeth while the crown is sound, but often in roots where the crown has decayed off, and although the pulp is destroyed, yet a portion of the nerve is alive, giving much pain. I extracted from the mouth of one patient two molares, and four bicuspids of the upper jaw, the fangs were increased three times their natural size by firm bone. She had suffered much nervous irritation. In these cases the periosteum secretes and deposits bony matter, as in necrosis of the tibia and other bones. This deposit would be advantageous on the incisores when we pivot artificial teeth, but on such teeth it is rarely seen, they are more frequently the subjects of alveolar abscess, the teeth bathed in pus waste away, become blackened, loose and drop out. This effect is frequently brought about by the injudicious force used by some dentists, in setting pivot teeth, and here I would say that pivot teeth should first be accurately fitted with soft pine, and then make a similar pivot of well seasoned hickory, in this way the jar occasioned by putting in and taking out the tooth can be avoided. The insertion of the hickory pivot, if well made, can be done with the thumb and fore-finger—let the hole be dry, a slight tap, having a piece of end-wood intervening, will set it home. When a tooth is set in this manner, inflammation rarely follows, unless it has previously existed in the root.

The extraction of the deciduous teeth rarely require the art of the dentist—in their regular course the fangs are absorbed and the crowns drop off the gums about the advent of the permanent teeth. I think the absorption of their fangs is hastened by the pressure of the permanent teeth. We always find the absorption greater next them. We occasionally meet with the fangs of the temporary teeth having passed through the alveolus

and gum, and cutting the lip, this is caused by the rapid growth of the permanent teeth. In these cases I slit the gum in the direction of the fang and pull it out.

Occasionally, it is necessary to extract a deciduous tooth to make room for a permanent, this happens when the permanent teeth are large and come forward before there is a corresponding growth in the maxilla, here the deciduous central incisores are loose or lost, but the permanent teeth, from their greater size, come forward in an angular position, and then, unless the laterals are extracted, permanent derangement will take place.

I have seen one case in a man of thirty-five years, where a central incisor was so turned, that the back part presented anteriorly. I could not get the history of the case, but concluded, from the irregularity of the teeth, that it was caused by the deciduous teeth not having been removed at proper periods. Afterwards it is generally necessary to extract the cuspidati to make room for the laterals, and here the necessity for extraction ceases; the deciduous molares having been replaced by bicuspids, and the jaw expanded so as to accommodate the permanent cuspidati. Should, however, this not be the case, the first permanent molar being sound, a bicuspid on one or both sides must be extracted, for the cuspidati must be preserved; no mouth can look well without them.

The first permanent molares, or six-year teeth, are often mistaken by parents for deciduous, and they are often lost before the attention of the dentist is called to them. In an article sent you on the subject of filling teeth, I insisted on the propriety of filling deciduous teeth with tin; many valuable teeth would thereby be saved from their coming under the inspection of a dentist in time; much infantile suffering would be avoided, and many an unquiet night be spared the parent, and it is, doubtless, of importance to preserve the crown of the deciduous tooth until the permanent is ready to take its place.

Hæmorrhage sometimes occurs after the extraction of the permanent teeth, and it is represented as difficult to arrest. I have used with uniform success a pledget of cotton saturated with the juice of lemon, or when that could not be had, I

dampen the cotton and roll it in the powdered tartaric acid which is nearly as good; pressure can be applied by cutting a piece of cork to fit between the teeth from whence the other was drawn, and then with a bandage closing the teeth to keep in place.

Mr. McL. had been salivated—a portion of the alveolus of the superior maxilla exfoliated, including the dens sapientiæ. I removed it, but little blood followed at the time; eight or ten hours after, about midnight, I was sent for; I took a lemon in my hand and went to his room; he must have bled a pint, it looked like a gallon; the bed and floor was apparently covered; and much blood and saliva in basins, &c. I saturated a pledget of cotton with the lemon-juice, applied it, and staid with him half an hour. The blood coagulated, and immediately ceased to flow; nor was there any return.

Mrs. McD. had her teeth loosened by salivary calculus, so as to be painful in any attempt to bite. I extracted them; followed by a profuse flow of blood. I used a lint-compress, covered by cork, the flow continued. I saturated cotton with tartaric acid, applied it, and on it placed the bit of cork. I had no farther trouble with it. The gums healed, and I replaced her own teeth on gold plate.

Miss D——. Extracted lower molar, followed by a flow of blood, but not much more than is usual. A few hours after I was sent for; the flow was profuse; used the tartaric acid; again sent for, it had not succeeded, and required several applications. I attributed the difficulty to a state of fever in the system existing at the time, and which required medication.

I was led to the use of the acid from its use in uterine hæmorrhage. It seems to have a specific power in coagulating the blood.

ARTICLE IV.

Observations upon the Importance and Value of a Knowledge of the Collateral Branches of Medicine and Surgery in connection with Dentistry. By James Robinson, D. D. S., London.

[Continued from vol. vii, p. 324.]

Having pursued the subject thus far, and demonstrated the advantages that the dental practitioner may derive from an acquaintance with anatomy and its intimate relations, physiology and pathology—having shown that a knowledge of medicine and surgery (in which these sciences are included) is essential to *his* reputation and the safety of his patient, I shall proceed to prove that the other collateral branches of medicine are of much, if not of equal importance—that the only legitimate way of studying the art *is as a whole*, and that the chain by which all these necessary branches of knowledge are connected, must be rendered insufficient by the absence of any, even the most unimportant of its links.

Dental surgery may be considered as an offset of medicine, modified it is true, and requiring other and important additional qualifications; but still it is so interwoven and mixed up with that science that no one can practice the one, at least scientifically and successfully, who has not a liberal acquaintance with the other, for who can comprehend the superstructure, who is ignorant of the foundation, or reason on effects, if unacquainted with the causes from which they arise? or the different processes by which they may have been modified?

Possessed of this knowledge, the dentist is enabled to give breadth to his views—to assimilate the local to the general treatment, and take advantage of every resource afforded either by nature or art—while on the contrary, without it, his practice must be uncertain and empyrical. He will have no real data to go upon, and if successful, it will be the result of chance rather than the legitimate effect of scientific reasoning.

It is a curious fact that with some wise heads a profession

ranks in dignity, in an inverse ratio, to its mental regularity, thus the *pure* surgeons consider every thing but the use of the scalpel or amputating knife (in the employment of which, a butcher would in all human probability be infinitely more expert) as beneath their dignity, and a knowledge of the collateral branches of medical science as supererogatory if not absolutely disgraceful. In the same way, the science of dental surgery has become to be considered, at least by some *intellectual* individuals, as an art *per se*, or as merely an *operative* one, while the fact directly the reverse is the case, and the scientific practitioner, who is armed at all points, will not only possess superior discrimination in the diagnosis of diseases, but infinitely more resources in combatting them, will be able in many cases to overcome difficulties, ameliorate suffering, and *avoid* operations that would be inevitable in the hands of one less liberally educated.

While medicine, properly so called, teaches the value of the different symptoms and appearances of the various forms of disease, and enables us to distinguish the one from the other, materia medica, which simply means the *materials* of *medicine*, enables us, as far as that is concerned, to supply remedial measures. That these sciences are intimately blended and connected with each other, is so self-evident, that materia medica must be considered rather as a subordinate, though important branch of medicine, than as a distinct and separate science.

Of what use would it be for a physician gravely to tell his patient that his pain proceeded from gravel or inflammation, unless prepared with remedies to combat it, or *vice versa*, what would he gain, by an intimate acquaintance with the properties and doses of every drug contained in the materia medica, or all the chemical remedies in the pharmacopoeia to boot, unless his knowledge of medicine taught him in what cases they might be employed with advantage.

Thus, then, while anatomy teaches the different parts of the human body, and physiology their duties—while pathology points out their diseased actions, and organic changes, a com-

bination by which we are able to discriminate sympathetic and symptomatic affections from structural diseases, materia medica, chemistry and botany form the three links in the chain of remedies, and it is of vital importance to the dental practitioner that these links should be perfect.

I do not mean for one moment to assert, that a man may not practice dental surgery; nay, that he may not gain a reputation, or, at all events, a fortune, without these acquirements; unfortunately, the converse of this is of too common occurrence, for the public are, generally speaking, more willing to patronise specious and showy pretension, rather than scientific desert—and the consequence is, that unless a practitioner have some more high and honorable feeling than the mere love of gain, or an avidity for meretricious praise; unless he be determined to sacrifice ease, comfort and self-interest to his profession, and be content to rank rather as a scientific practitioner than a fashionable dentist, with all the pecuniary emolument thereunto belonging, he may be tempted to neglect all but the common and vulgar necessities of his profession, and seeing others *get on* with a small amount of knowledge, fancy that he may do the same, and that a liberal and general knowledge of medicine, is, to say the least, unnecessary.

That a liberal acquaintance with materia medica, is essential to the scientific dentist is indisputable. If he have only a contracted knowledge of the subject, he may, it is true, order an application to an unsound tooth, or prescribe a lotion for the mouth, but even putting out of the question what may be called general treatment—he will not, he cannot be able to select the best or most *appropriate* means, or employ them in a scientific or artistic manner; he may do as his *teacher* has instructed him, but he will not be able to practice with any reliance on his own judgment. Should he venture out of the beaten track, it will be with fear and trembling to himself, and uncertainty, if not danger to his patient. Like a friend of ours, who always added sweet spirits of nitre to a febrifuge mixture, because his master had done so before him. If an acquaintance with materia medica is essential to the dental practitioner, an acquaintance

with chemistry is still more so; for as the former, generally speaking, refers to vegetable, or, as they are called simple remedies, the latter involves those of a more complicated character, having, independently of these medical effects, peculiar and specific actions on each other, and, although, in many cases these actions are evidenced by visible and palpable changes, in others they are so obscure, that unless a practitioner be perfectly acquainted with them, he may, while prescribing what he imagines a judicious course, be merely giving what would be called, in vulgar parlance, chip in porridge.

There are scarcely two, of what may be strictly called chemical medicines, that can be mixed without some change in one or both: Thus, magnesia which is, in its simple state, an absorbent earth, has its action changed and reversed by the action of fire; while the addition of sulphuric acid forms the compound called Epsom salts, and yet, *calcined* magnesia may be mixed with the acid, and the new compound formed, without any visible intimation of the changes. Again, preparations of quicksilver mixed with alkalies, undergo a change of color, and it is from this cause that the amalgams used for stopping the teeth, under the names of anodyne cement, &c. &c., so frequently blacken and discolor them.

Chemical remedies, generally speaking, have a more decided and concentrated action than those of a vegetable kind, which renders them at the same time more effective if used with discretion, but at the same time more dangerous in the hands of ignorance and empiricism; for while they are more certain in their action, they are more liable to have that action interfered with and changed by admixture.

Thus, then, in the treatment of disease, whether dental or general, or a combination of both, it is necessary not only to ascertain what the disease is, but what remedies will counteract it, but to select those best adapted to the purpose; for though, under certain circumstances we may be obliged to employ one remedy, we are bound, when we have the choice, to select the most appropriate, and this can only be done by a perfect acquaintance with materia medica and chemistry.

Take a case of poisoning, which, though unconnected, will illustrate my position. A person has taken sulphuric acid, magnesia will neutralise and convert it into a purgative salt. If the carbonate of magnesia be employed, a considerable quantity of gas will be evolved in the stomach, producing distension and flatulence; while calcined magnesia will neutralise the acid without this inconvenience. Still, in a case of necessity, we should use the one in preference to waiting for the other. These cases, however, do not occur in dental practice in which there is always time to select the remedy best adapted to the purpose.

ARTICLE V.

A Course of Lectures on Dental Physiology and Surgery, delivered at the Middlesex Hospital School. By JOHN TOMES, ESQ. Surgeon Dentist to the Hospital.

(Continued from Vol. vii. No. 2.)

LECTURE VII.

ABNORMAL CONDITIONS OF THE FIRST DENTITION—DISEASES OF THE GUMS BEFORE AND DURING THE ERUPTION OF THE MILK TEETH (INFLAMMATION AND INDURATION)—DISEASES OF THE TISSUES OF THE MILK TEETH (CARIES AND NECROSIS)—DISEASES OF THE GUMS AFTER THE ERUPTION OF THE MILK TEETH—DISEASE OF THE ALVEOLAR PERIOSTEUM OF THE MILK TEETH.

ABNORMAL CONDITIONS OF THE SECOND DENTITION—IRREGULARITY IN THE TIME OF ERUPTION OF THE PERMANENT TEETH.

GENTLEMEN:—Since I have directed my attention to the diseases of the teeth, it has been my habit to make notes of the most instructive cases that have come under my notice, and also of those that have been related by authors. In order to

accomplish the purpose I have had in view—namely, to gain useful illustrations of the various dental maladies—I arranged the subject into divisions and subdivisions. This classification, which I adopted as convenient for my private use, I shall follow in describing to you the diseases of the teeth. I have therefore prepared a table, the perusal of which will give you the order in which each malady will be discussed.

In accordance with this plan, we shall first direct our attention to the abnormal conditions of the teeth and gums during dentition. I have already described to you the symptoms which bring in and accompany the eruption of the milk teeth in the healthy subject: it now remains for me to direct your attention to the process when attended with unfavorable symptoms—to interrupted dentition.

The attendant symptoms are both local and general, but as the latter generally arise out of, and are consequent upon the local symptoms, we shall take the local condition of the gums as the base of this division of the subject.

Interrupted dentition is accompanied by either inflammation or induration of the gums, or by a combination of these conditions.

Inflammation of the Gums.—The local symptoms are: swelling, heat, redness, and pain, accompanied by excessive tenderness, so that the slightest pressure on the affected part becomes intolerable. These symptoms will vary in degree in different cases, and they will vary relatively also. In one case the swelling will be great, while the heat and redness will be moderate, and *vice versa:* aphthous ulceration not unfrequently accompanied with swelling and tenderness of the salivary glands. There is a profuse flow of viscid saliva. With these local symptoms, we have general disturbance of the system, evinced by a dry hot skin, rapid pulse, hurried respiration, thirst, broken sleep, vitiated and scanty secretions. But, in addition to these local and general symptoms of abnormal dentition, it not unfrequently happens that symptomatic affections arise, and these of no trivial nature. In the excited state of the system during painful dentition, inflammation either acute or

chronic may attack any organ of the body. The organs of respiration, and the brain and nervous system, seem to be the most susceptible. Bowel complaints, terminating in mesenteric disease, sometimes supervene.

Many of the symptoms arising from interrupted dentition are of a purely nervous character. These vary, from slight spasmodic twitching of the muscles, to violent convulsions ending in death.

Sudden development of the teeth; the appearance of several teeth at the same time; the evolution of the teeth at an early age; unequal rate of development in the teeth and jaw, so that there is want of sufficient space for the teeth; delicate health of the patient; are enumerated as the causes of abnormal dentition, and the attendant diseases. But pressure produced by the growing tooth upon the inflamed gum, and upon the formative pulp, is considered as the more immediate cause of the active symptoms.

The inflammation of the gums, together with the symptomatic affections, not unfrequently precede some time the appearance of the tooth. The teeth are then said to be breeding. Towards the later stage of the process, the gums, instead of presenting uniform redness, are red only at the base, while that portion which lies over the coming tooth is tense, pale, and bloodless, a condition produced by the pressure of the tooth from within. In this and in the previous stages of the inflammation the epithelium peels off the surface of the affected gum, which bleeds from the slightest touch. If nature is allowed to take her course, the tooth after a while appears through the gum, and the little patient, if no serious coincident disease has established itself, returns to good health.

But instead of dentition proceeding, and nature working her own cure, serious maladies of fatal character may seize and carry off the patient in a few hours. Inflammation may attack a vital organ, and yield to no treatment. Cerebral symptoms may arise and terminate in coma or in fatal convulsions.

Abnormal States of the Teeth and Gums.

Abnormal conditions during the presence of the milk teeth.	Diseases of the gums before the eruption of the teeth	Inflammation. Induration.
	Diseases of the dental tissues	Caries. Necrosis.
	Diseases of the gums after the eruption of the teeth	Inflammation. Ulceration.
	Diseases of the alveolar periosteum	Inflammation.
Abnormal conditions during the presence of the permanent teeth.	Irregularity in the time of eruption of the permanent teeth.	
	Irregularity in the position of the permanent teeth.	
	Mechanical injuries of the teeth	Fracture. Dislocation.
	Mechanical injuries of the alveoli	Fracture.
	Diseases of the dental tissues	Caries. Necrosis. Exostosis. Pain.
	Diseases of the pulp	Irritation. Inflammation. Ulceration. Granulation.
	Diseases of the alveolar periosteum	Inflammation. Suppuration. Hæmorrhage.
	Diseases of the alveoli	Inflammation. Necrosis. Absorption.
	Diseases of the gums	Inflammation. Recedence. Tumors.
	Tartar.	

The primary or predisposing cause of the alarming diseases I have enumerated as connected with dentition, is often overlooked, from the very intensity of the diseases themselves, and attention is alone directed to their relief, without a thought being given to the predisposing cause; not that any local treatment addressed to the gums would remove inflammation affecting a distant organ arising as a consequence of irritation existing in the gums. Yet, if that irritation be removed, the chances of recovery will be greatly enhanced.

It will be your duty then, whenever called upon to treat a child suffering from disease, whatever be the nature of the disease (unless of specific character, such as small-pox,) to inquire into the state of dentition, and if you find the gums inflamed, and a tooth presenting, to freely lance the imposed gum. It is useless to lance the gum superficially; it should be divided down to the surface of the pressing tooth, even if this

be at some little depth in the gum. Having relieved the state of the gum, attention must be directed to the coincident malady.

It has been supposed by some writers that lancing the gums before a tooth is ready to come through, retards rather than facilitates the future passage of the tooth. They consider that the cicatrix formed after the lancing is less readily absorbed than the gum would have been had there been no cicatrix, and, therefore, that an obstacle is created by the operations; unless, indeed, the tooth is so near the surface that it passes through the wound before the gum can heal. The assumption is not borne out by observation; cicatrices are more readily absorbed than natural tissues. You have many opportunities of observing how prone a cicatrix is to absorb, in the frequent occurrence of ulcers on cicatrices of the leg, and other parts of the body.

Induration of the Gums.

Instead of the gum becoming removed for the passage of the teeth, we sometimes find it becomes indurated and thickened. In this condition there is no considerable tenderness, scarcely any increase in the quantity of saliva. The gum on inspection is elevated, but not more florid than the neighboring parts. Indeed, the local symptoms are slight, and often overlooked.

In connection with interrupted dentition, accompanied with these local conditions, the general symptoms are not less severe than where there is inflammation of the gums. The skin is hot and dry, the appetite fails: the child will often refuse the breast for an unusually long period. This state of health is often attributed to the presence of worms, and medicines are given to effect their expulsion.

In induration as in inflammation of the gums, either inflammatory or spasmodic diseases may arise and require active treatment, the remedies being such as the character of the disorder may indicate; but in no instance must we neglect to make free incisions in the gums over the teeth that are bound down by the hardened tissue.

Where the symptomatic disease is of a purely spasmodic

character, this simple operation will sometimes produce instant remission of the symptoms, but when the disorder has advanced to alteration of structure, the most we can expect will be a remission in the intensity of the symptoms, and a state of system more favorable for the action of remedies useful in the treatment of the disease.

Dr. Ashburner has written a very valuable work on dentition, and its coincident disorders, in which a great number of cases are given, where lancing the gums produced instant relief to serious and distressing spasmodic diseases. The two following cases are taken from his work.

"I attended a fine boy from the cutting of its first incisor tooth to the completion of its dentition of twenty teeth. It was the last child of a family in which all the children had afforded examples of abnormal dentition. This boy was of a nervous temperament, with black hair and eyes: every tooth had come forward with a want of biliary secretion. Nothing could exceed the care observed by the mother as to the diet of this infant; yet, whenever an effort at developing a tooth took place, she was always aware, from the deficiency of bile in the evacuations, that he was to have slight fever, sometimes with a catarrh and cough, always with twitchings of the face and fingers, and starting and moaning during sleep, and a catch in fetching a deep sigh. With the appearance of the four first molares the spasms were more severe. The thumb of the right hand was thrust into the palm, and the fingers clenched upon it; the toes were drawn down, the face was distorted. These spasms relaxed and reappeared. I found on these occasions that the tooth was always abnormal in its progress; seldom observing its turn, and never its time. The gum lancet freely used always cured these spasms. On the last occasion I was sent for in great haste, for the spasms had continued into an epileptic fit, from which I speedily and effectually relieved my little patient, by cutting through the capsule of the coming tooth."

"I was called one evening to the child of a lady in Regent street. It was a fine girl of fourteen months old. The head was large; dark hair, dark eyes. It was in a tub of warm

water, quite insensible, passing from a state of epilepsy into tetanus. Its eyes were not influenced by light; the pupils remained dilated. The anterior molaris of the left side, in the upper jaw, was ready to come through. I cut freely through its capsule with my gum lancet; in two minutes the child was on its knees in the water, playing with the handle of the tub, in excellent spirits. This child had been twitching the angle of its mouth, and had had its right arm spasmodically affected during the day."

Mr. Bell, in speaking of the diseases consequent upon the irritation produced by abnormal first dentition, and in reference to the frequent occurrence of diseases of the brain from this cause, makes the following remarks:

"The brain, too, is frequently affected; the pupils of the eyes are permanently expanded, the head is continually to and fro, with an uneasy restless motion, accompanied with an increased moaning. Spasm of the voluntary muscles frequently succeeds, and convulsions at length recur at intervals, with increasing violence; which, unless immediate relief be obtained, too often terminate at once the little patient's sufferings and existence. The symptoms which I have here described as connected with a morbid state of the brain, often arising either from the overcharged condition of the vessels, or from actual effusion, do not always terminate fatally; but even where they are for the time relieved, and their acute form subdued, the occurrence of confirmed hydrocephalus is amongst the most common results of such affections. It appears, indeed, that the irritation has not been sufficiently attended to as the origin of this disease. Were this view of its cause more generally taken, it is, I think, probable that it may, in many cases, be arrested in its earlier stages, and its dreadful consequences, death, or a state of idiocy far worse than death, be frequently prevented."

Caries and Necrosis of the Temporary Teeth.

The temporary teeth are subject to the death and decompo-

sition of a portion, constituting what is generally called caries, and to death of the whole tooth, constituting necrosis of the tooth. The former of these affections is generally common to the temporary and permanent teeth, and will be considered when we come to the diseases of the permanent teeth. But necrosis is more frequently found in the milk teeth, and moreover presents some peculiarities.

Dental necrosis in the young subject is usually consequent upon the destruction of the whole or part of the crown by caries. The pulp, from the exposure is destroyed; after which, all vitality is lost in the fangs. Supposing absorption of the roots to have commenced, the process is arrested, the remaining portion of the fangs becomes discolored, and the enclosing alveolus becomes absorbed. The gum then inflames and ulcerates, and the fangs of the teeth are exposed on the surface, from which, in a little time, they become detached. In the process, the tooth itself is not unfrequently borne up towards the surface, and is found lying across the gum, with the fangs directed towards the cheek, which is not uncommonly ulcerated by the rough points irritating the mucous membrane.

It does not always happen that the inflammation produced by the necrosed tooth is slight in degree, or limited in its effects; on the contrary, the neighboring teeth and alveoli may partake of the diseased action, and suffer necrosis; and further, you will find in the separated sequestrum the rudiments of the permanent.

Treatment.—The dead tooth or teeth should be removed and the inflammation combatted by general treatment. If the ulcer in the cheek present an unhealthy appearance, the surface should be touched once or twice with sulphate of copper. If the alveoli are necrosed, a time must be given for the dead bone to be separated from the living; but so soon as this is effected, the sequestrum should be removed. During the time the above bone remains in the mouth a wash should be used, composed of chloride of lime and water, as a means of rendering the dead bone less offensive, and keeping the parts clean.

Diseases of the Gums during the Presence of the Temporary Teeth.

At this period of life the gums are liable to be attacked with inflammation and other diseases common to childhood and after life. These require no special notice in this division of our subject, but will come under our notice when treating of the diseases of the gums generally.

The gums are, however, during childhood subject to a peculiar form of ulceration closely allied to that form of disease, which occurring in the adult in any other situation than the mouth, is called phagedena, and which when seated in the mouth, is by most writers called cancrum oris. The disease commences on the free edge of the gum with inflammation, which is marked by swelling, vascularity, and lividity of surface. Ulceration then commences on the edge of the gum, and quickly extends towards the alveolus, destroying in its course the texture involved. The disease, in addition to extending towards the alveoli, proceeds to the gums of the neighboring teeth, but in these, as in those first attacked, the free edges of the gums are the parts first destroyed. The most common seat of the disease at its commencement is the edge of the gum about the canine and first molar. The gums of the lower jaw seem more liable to the disease than those of the upper maxilla.

In the cases which have come under my observation, the ulceration has commenced on the external edge of the gums, but has not with one exception, passed to the gums between the teeth, and thence to the inner gums. This may, however, have arisen from the cases being treated early, or being in themselves less severe than those occurring to other practitioners. The surface of the cheek lying in contact with the ulcerated surface of the gums becomes involved in a similar disease, so that the surfaces of the two ulcers lie in contact. The parts immediately surrounding the ulceration are thickened, indurated, and of a deep red color. The diseased action, in addition to extending over the surface of the gum, also affects in an almost

equal degree the periosteal connection between the root of the teeth and the alveolus. The teeth become loose, and seem in their loose state to cause, by irritation, continuance of the disease. The teeth, instead of becoming merely loose in severe cases, are necrosed, blacken, and produce by their presence, as foreign bodies, an increase of the inflammatory action. The surface of the ulcer is so peculiar in character as to be immediately recognised; it is of a pale yellow or straw color, with here and there a red point, slightly raised above the general surface, which bleeds on the slightest touch. The disease in its progress quickly destroys the gum, and leaves exposed the alveolus, which then becomes necrosed. The ulceration, if unchecked by treatment, in unfavorable cases, extends, destroying in its course the texture of the mouth, till some large vessel is laid open, or the patient sinks from general exhaustion.

The causes of this destructive form of ulceration are for the most part constitutional. It is only seen in children of strumous habit, who from some cause are in a low and debilitated condition, and is most commonly found in those who have resided in damp and badly ventilated situations, and have been badly fed. When I held the office of dentist to King's College Hospital, a number of cases of this disease presented themselves, almost all of which came from the immediate neighborhood of Clare Market. At this hospital I have seen but three or four cases during the past two years, and these were slight only.

The peculiar form of ulceration which I have described has occurred to fearful extent in the children of the Asylum of Philadelphia. A memoir was published, by Dr. Coates, in "The North American Medical and Surgical," for July, 1826, in which is an excellent account of a number of cases terminating fatally.

But in these cases two forms of disease are described under one name, *cancrum oris*. The one, similar to that I have described to you as commencing in ulceration, about the edges of the gums; another, in which some part of the cheeks or fauces is attacked with sphacelus, succeeded by ulceration. The lat-

ter disease does not affect the gums, though it seems from Dr. Coates' paper to supervene in some cases upon ulceration of the gums. This disease, affecting other parts of the mouth than the gums, does not properly belong to our subject, and though in its nature allied to the corroding ulceration attacking the gums, will, I think, be found to possess points of dissimilarity sufficient to establish it as a distinct disease. For this reason I have not adopted the name of cancrum oris to the phagadenic ulceration of the gums.

Treatment.—To successfully combat the ulceration, both local and constitutional treatment must be adopted. The state of the bowels must be first attended to; a mild aperient should be given in the form of grey powder—this medicine answering the double purpose of stimulating the liver, which is generally defective in its secretions, and expelling any accumulation of acrid matter from the bowels. Tonics and liberal diet should then be administered. The local treatment must be similar to that adopted in ulceration of specific character, ulceration which increases by the acridity of its own secretion; that is, the surface should be perfectly destroyed by some agent which, by its chemical action, will decompose both the secretion and the surface of the sore. Nitrate of silver, or potassa fusa, or either of the mineral acids, will effect the purpose, but nitrate of silver is perhaps the preferable agent. In applying the remedy the surface should be first wiped dry, and then with a stick of caustic the ulcerated part rubbed over, taking care that no point remains untouched. The immediate effect of the nitrate of silver will be marked by a change of color of the surface to which it has been applied.

In no case under my own observation has this treatment failed. The superficial slough, caused by the nitrate of silver, has in the course of two or three days separated, leaving a healthy ulcer, which has readily healed.

Supposing any teeth have been rendered loose by the disease they must be removed, otherwise they will keep up the action. The American author, in the cases to which I have alluded, used with success sulphate of copper as a local application.

The copper in my hands has not been equally successful. After using it I have been obliged to have recourse to the nitrate of silver. In a few obstinate cases, where the patient has been in wretched general health from want of proper or sufficient food, I have found it necessary to repeat the application of caustic twice or even three times, at intervals of six or eight days, before the ulcer assumed a healthy surface.

My friend Dr. West tells me that he has succeeded in curing the disease by the administration of chloride of potassa in small doses, repeated every four hours, and without having recourse to any local treatment.*

Disease of the Alveolar Periosteum of the Temporary Teeth.

The alveolar periosteum, which connects the fang of the tooth to the enclosing alveolus, is subject to diseased action. It may become generally inflamed, or a certain portion only may be affected. The cause which most frequently produces disease in this situation is caries, or necrosis of the tooth; in which case the inflammation will at first be confined to the part surrounding the apex of the root, from which the membrane becomes separated. Pus is excreted from that surface, which is no longer adherent to the fang, so that the apex of the latter is placed in an abscess. Inflammation of the alveolar periosteum is recognised by pain in the tooth, extending to the jaw; slight elongation of the tooth, which gives pain when pressed upon; swelling, with heat and redness in the gum over the alveolus containing the tooth. If allowed to take its course the external swelling will increase, and the cheek will become more or less swollen. The skin hot and dry. A portion of the alveolus, opposite the external gum, will become absorbed, and allow the pus to advance towards the surface. In the course of a few days the swelling in the gum will become soft; the surface at

* This treatment was, I believe, first made generally known to the profession by Dr. Heat, in a paper published in the Medico-Chirurgical Transactions of last year.

some point will give way, and pus will escape. The symptoms will then subside, leaving a small fistulous opening, surrounded with two or three granulations communicating with the interior of the abscess; and the tooth will give no further trouble until, from some accidental cause, the orifice through which the discharge has taken place has closed, when we shall again have all the symptoms of alveolar inflammation, terminating in abscess.

Treatment.—The tooth which has induced the malady should be immediately extracted, and the disease will be cut short. If pus has formed, the gum should be freely lanced, in order to facilitate the escape, though if the tooth be extracted this will be unnecessary, unless we find it between the gum and the surface of the alveolus.

Abnormal Second Dentition—Irregularity in the time of the Eruption of the Permanent Teeth.

Two separate actions are concerned in the renewal of the teeth; one action, the removal of the temporary teeth; the other, the evolution of the permanent.

For the regular appearance of the second teeth it is necessary that each of these should proceed uninterruptedly, and that the jaws should have attained the requisite size. These conditions, from causes which it is not always easy to estimate, are not in all cases fulfilled.

The fangs of the temporary teeth in some cases remain unabsorbed, and the teeth keep their position to the exclusion of those that should take their place. This cause of irregularity in time most frequently occurs in the milk molars than to either of the anterior teeth. During the last two years seven cases have come under my notice, in which, at the age of from 15 to 27 years, one or more of the bicuspides were absent, and their predecessors, the milk molares, present. The patients have come to the hospital from suffering pain in the temporary teeth. On removing the temporary, the succeeding permanent teeth were seen coming forward.

The reason for assuming that in these cases the permanent were kept back by the temporary teeth is, that the crown of the former is received between the fangs of the latter, and therefore cannot come through without the previous removal of the superimposed tooth. Again, irregularity in time seldom occurs to the same degree in any of the more anterior teeth, which, when the temporary teeth remain after the usual time for their ejection, appear either anterior or posterior to them.

Another cause of irregularity in the time of eruption of the adult teeth, arises from insufficient space in the jaw, from defective growth. The canine teeth are retarded from this cause more frequently than any other teeth, arising from the canine being last to be cut, and the space being occupied by the incisores and bicuspides which have been previously evolved. I have seen several specimens of this—one on the table—in which the canine tooth, from want of space, has been developed, but remained deep in the jaw, completely imbedded in bone, the crown resting between the fangs of the lateral incisor and the first bicuspides. Nature, in these cases, has fitted the teeth for their peculiar position by developing an extremely short fang.

The symptoms produced by interruption to the evolution of the permanent teeth, which are preceded by temporary teeth, are seldom severe; and, indeed, indications are not unfrequently wholly absent. When they are present, pain is felt about the obstructing temporary tooth, extending to the angle of the jaw. The pain is far from constant, coming on and going off at uncertain intervals. The gum round the tooth is generally slightly inflamed. The indications subside on the removal of the obstructing tooth.

The wisdom teeth are liable to great irregularity in the time of their appearance, which arises from want of space in the jaw, or from irregularity in the position in which the development has taken place. Varied and distressing symptoms arise from obstruction to the development of these teeth; but as these obstructions mostly arise from irregularity in the position of the teeth, we shall postpone entering into the subject until we come to the consideration of the irregularities in the position of the permanent teeth.

LECTURE VIII.*

IRREGULARITY IN THE POSITION OF THE PERMANENT TEETH—GENERAL REMARKS—ANTERIOR POSITION OF THE UNDER TEETH, OR "UNDERHUNG"—ANTAGONISM OF THE CUTTING EDGES OF THE UPPER AND LOWER FRONT TEETH—EXCESSIVE PROMINENCE OF THE UPPER FRONT TEETH.

GENTLEMEN:—To-day I shall bring to your notice the various deviations from the normal arrangement of the teeth. You have been told that the front teeth, (by which I mean the incisores and canines,) with the bicuspides, occupy in the well-formed jaw a semi-circle, and that the molares extend backwards from the two ends of the semi-circle, in slightly diverging lines; thus forming together an elliptic curve. In this curve no tooth projects before or recedes behind the neighboring teeth. Such is the normal arrangement of the perfectly developed teeth in well formed jaws. Instead, however, of the teeth presenting this even and uninterrupted line, we occasionally find that one or more teeth are placed either external or internal to the line, the teeth themselves being at the same time individually well formed. In the normal position each tooth has its anterior and posterior, or to speak more correctly, its buccal and lingual surfaces, placed at right angles to the radius of the curve which

* The paper on "Cancrum Oris," by Dr. Henry Hunt, to which I referred in my last lecture, is continued in vol. xxvi of the Medico-Chirurgical Transactions. Dr. Hunt gives the following as the result of his experience:

"The quantity of salt (chlorate of potash) I have been in the habit of prescribing varies from twenty to sixty grains, according to the age of the child, in divided doses, in twenty-four hours, dissolved in water: the beneficial effect is often observed on the following day, almost always on the second; the disagreeable fœtor soon lessens, the sores put on a healthy reparative action, the dribbling of saliva diminishes, and if there is mere ulceration, it speedily heals, if there is an eschar, it soon separates, and the sore granulates kindly. It is sometimes advisable, indeed necessary, that the aperient should be occasionally repeated."

it contributes to form; but a tooth may be twisted on its axis, and have these surfaces in a line with the radius, and present its sides instead of the broad surfaces, anteriorly and posteriorly, and thus constitute a form of abnormal position. Mr. Saunders, in his lectures before referred to, speaks of a case in which a front tooth was twisted half way round, so that the proper lingual surface was anterior. In the normal arrangement the anterior teeth of the upper close over and in front of the corresponding teeth of the under jaw. In some cases, however, from malposition of the teeth, or from want of a proper ratio in the growth of the upper and lower jaw, the upper teeth close posterior to those of the lower jaw—a condition commonly denominated "underhung."

Instead of the under teeth closing anterior to the upper, we find in some instances that they close upon the cutting edges of the upper teeth; this constitutes another form of irregularity, though partaking of the same character as the preceding form.

A third form of abnormal position occurs where the front teeth do not come together at all, a space of variable width separating them when the mouth is closed.

From what has been stated you will observe that the subject, so far as the front teeth are concerned, divides itself into two heads; first, abnormal position of the whole of the front teeth; and secondly, abnormal position of part of the front teeth, or perfect and partial irregularity of the front teeth.

The causes of abnormal position of the teeth are almost exclusively of a mechanical nature, and may be divided into four classes. First, want of sufficient room in the alveolar arch for regular arrangement. Secondly, abnormal position during development, as regards the fangs of the preceding temporary teeth. Thus, supposing the cutting edge of an incisor at the time of formation be placed anterior to instead of (as is normal) posterior to the fang of the milk tooth, the permanent tooth will come down and occupy a position anterior to the proper place. Thirdly, non-absorption of the fangs of the milk teeth, and consequent prolonged presence of the milk tooth; thus obliging the permanent tooth to take an anterior or posterior position.

Fourthly, a more rapid growth in the one jaw than in the other, producing undue prominences of the teeth or abnormal development of the jaws. In a preparation on the table the teeth are well formed, and arranged normally, yet when the jaws are closed and the molares brought in contact, the front teeth do not meet by a quarter of an inch, arising from the peculiar form of the lower jaw.

In the foregoing classification I have enumerated to you the principal kinds of dental irregularity, with the causes producing them. In practice, however, you will not be able to classify from its cause each case of dental irregularity in the manner I have done in this description; on the contrary, you will meet with cases in which the producing cause partakes in some degree of the character of each division, and yet does not belong to either exclusively. However, by adopting this somewhat arbitrary division of the subject, I think I shall be able to give you directions for recognizing the cause of irregularity, and the treatment to be pursued; and in a more intelligible form than though we treated the matter with less system.

It is only necessary to recognize the cause of dental irregularity to pronounce with certainty whether the evil admits of remedy.

If malformation of the jaw be the cause there is but little hope of remedy; if the jaws are too small to admit of the natural arrangement of the teeth, but are otherwise well formed, then we may, by the judicious application of mechanical means, with which I shall presently make you acquainted, reduce the teeth to their normal position.

Treatment.—When we see how much can be done by orthopædic surgery in restoring crooked and deformed limbs to the natural form, whether the patient be middle-aged or young, we should at once conclude, even without the aid of experience, that much might be done to remedy irregularity in the arrangement of the teeth, and we should become more certain of our point when we observe that if the molar teeth from age or accident be lost, the under incisores closing against the posterior

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inclined surfaces of the upper incisores, slowly but surely force the latter outwards.

But experience proves that when dental irregularity arises from any other cause than malformation of the jaws, the malplaced tooth or teeth may, by steady and continuous pressure, be reduced to the proper position: sufficient alveolar space, of course, having been by some means gained.

The treatment, then, mainly consists in applying steady uniform pressure upon the irregular tooth in the direction of the place you wish the tooth to occupy.

What has been said of irregularity in the position of the front teeth applies generally to irregularity in the bicuspides, as also to the molares, though the latter are less frequently subject to irregularity in position, and when it does occur, the degree is very slight, amounting, except in rare cases, to nothing more than the one standing a little out, and the next a little in, thus forming a zigzag line. The wisdom tooth, from its peculiar situation in the jaw, is liable to several characteristic forms of irregularity leading to great inconvenience; we will, therefore, notice these after going through the forms of irregularity with the treatment in the more anterior teeth.

From this general outline we will proceed to consider our subject in detail.

Complete Irregularity in the Front Teeth.

It can scarcely happen that we have irregularity in the teeth of one jaw without a corresponding irregularity in the teeth of the other jaw; the one following as a consequence of the other.

The most common abnormal position occurs in those cases where the upper teeth, on closing the mouth, pass behind those of the under jaw. This condition, when once established, is permanently maintained by the teeth of the under jaw, for where there is any force tending to press the upper teeth outwards into their proper position, the act of closing the mouth, and the consequent pressure of the under teeth upon the anterior surface of the upper teeth, would press them inwards, and thus overcome the force employed by nature to remedy the defect.

This form of malposition of the teeth may arise from several causes. Thus the under jaw and teeth may be developed more rapidly than the upper. The incisores of the under jaw usually appear before those of the upper jaw, and take their position internal to the temporary teeth, which at the time are usually loose and quickly fall out, and then the succeeding teeth come forward and occupy their places. But while this is going on, the upper incisores usually appear through the gum, coming through internal to the temporary teeth. Supposing, however, that the temporary are not loose, but retain their places, the permanent teeth are then forced still more internally, and if the front teeth of the under jaw have progressed in their development they will close between the temporary and permanent teeth of the upper jaw. The teeth having once assumed this position, necessarily retain it, unless mechanical means are resorted to for remedying the defect.

A third cause of the posterior position of the front teeth of the upper jaw may arise in the permanent teeth of the under jaw, coming through anteriorly to the temporary teeth, so that the upper teeth, closing behind them, tend to force them still further outwards.

Treatment.—The causes of the reversal of the relative position of the front teeth of the two jaws you have seen is purely mechanical, and that the defect is maintained by a mechanical cause. Our treatment must therefore be mechanical also. The first thing we have to do is to prevent the front teeth from closing, thus disabling them from exercising any influence upon each other. This is effected by placing caps of metal or ivory upon the masticating surface of the molares of the upper jaw, and of such a thickness that when the mouth is closed the front teeth no longer meet. Having attained this point, a steady uniform pressure must be directed against the posterior surface of the misplaced teeth, and continued till, on removing the caps upon the molares, the upper teeth are found to close in their natural position: the position having been once gained is retained by the action of the under teeth upon the inclined posterior surface.

There are three methods of applying the pressure to force the teeth outwards. In one a fixed point is gained by fitting a piece of ivory to the hard palate and the surfaces of the necks of the teeth, to which it is tied so as to prevent the possibility of motion: pieces of dry compressed wood are then interposed between the ivory and the necks of the teeth you wish to be moved outwards. The wood on absorbing moisture swells, and as the fitted ivory cannot be moved backwards the teeth are necessarily moved forwards. After the wood has remained about eight and forty hours, it should be removed and a fresh piece of dry wood put in its place, which on swelling, force the teeth still further outwards. The renewal of the wood is repeated till the teeth have assumed the required position; the ivory is then removed from the palate and the caps from the teeth, and the process is allowed to be completed by the action of the upper and under teeth upon each other: the under forcing the upper outwards, and the upper pressing the under inwards, till the molar teeth come in contact, when the front teeth assume their permanent place.

In the second method the fixed point is made anterior to the teeth, and is accomplished in the following manner: Caps, as in the former case, are fixed upon the molar teeth; from thence a strong piece of flattened gold or silver wire is made to pass in front of the teeth. Opposite each tooth the wire is perforated with one or two holes, through which a ligature of silk is passed round the neck of the tooth; the silk is then tied tightly to the wire. The teeth by the action of the silk are dragged outwards. The ligature requires to be tightened or removed from time to time till the teeth have assumed the required position, when the apparatus is removed. Instead of silk the vulcanised India-rubber is frequently used. The third method of treatment consists in fitting metal to the surface of the front teeth of the lower jaw. The plate is continued upwards above the edge of the teeth, but instead of proceeding in the same line, is turned inwards, so that on an attempt to close the mouth the piece of metal passes behind the teeth of the upper jaw, and presenting an inclined plane, forces them outwards. The suc-

cess of the method of treatment will be greatly enhanced by capping the molar teeth.

Of the three forms of treatment I have described to you I much prefer the first, being more easy of application, more rapid in its effects, and less troublesome to the patient than the two succeeding methods.

A second form of complete irregularity of front teeth is when the upper and lower close upon each other. In this case the cutting edges are quickly worn down, and the teeth look short and stunted, or, losing the molares, the front teeth then become worn down to the level of the gums, and the pulp cavity filled by vascular dentine, rendering the remaining portion of the tooth solid.

This condition differs only in degree from that which I have described, and though, as far as personal appearance is concerned, it is less objectionable than that, yet in its effect it is more injurious. Where the upper teeth close behind the under, the teeth themselves are not injured, but where they close upon each other the thin edges are soon worn, and the teeth cease to be strictly incisores, but are capable only of crushing.

The treatment necessary for the reduction of this irregularity is precisely similar to that required in the treatment of the "under lining."

However, in these cases, if attention is directed to the subject early, the simple pressure hy the thumbs of the upper teeth outwards will, in many cases, with a little care and perseverance, place the teeth in their proper relative position; especially if frequent attempts be made to place the under teeth by drawing back the teeth of the under jaw behind those of the upper jaw.

As a farther means of restoration, the teeth may be closed upon some substance, a piece of wood, or the handle of a teaspoon, and the spoon pressed downwards: by the motion the upper teeth will be pressed outwards by that portion of the spoon within the mouth, while the under teeth acting as a fulcrum will be pressed inwards. This simple operation will, if frequently repeated, tend to reduce the teeth to their proper situation.

A third malposition of the front teeth occurs in an excessvie prominence of the upper set. The front teeth press into the lips, are constantly exposed, and when the mouth is closed rest upon the under lip. This form of irregularity is more or less connected with the defective development of the superior maxilla. The alveolar processes are developed at a considerable angle with the general surface of the face, and the edges embracing the necks of the teeth, are, therefore, very prominent. This prominence might arise from several causes. Thus the permanent teeth might come down in front instead of behind the temporary teeth and their alveoli, and supposing the milk teeth to be present a little beyond the usual period would at once tend to the deformity in question.

Again, if the incisores are long, and the molar teeth short, the under incisores on the mouth being closed, will, instead of resting upon the basal ridge of the upper teeth, press down the inclination of the ridge, and, finally get fairly behind the teeth, and with their edges against the surface of the gums. We often see this state produced when, from age or some other cause, the molares and bicuspides are lost.

Treatment.—The first thing to be done towards remedying this evil is to remove one or two bicuspid teeth, so that space may be gained for bringing the teeth inwards, which may then be effected by pressure inwards, the fixed point being either external to the teeth in the form of a band of metal, or internal to the teeth in the form of a piece of ivory fitted to the palate.

Before, however, we proceed to the remedy, we must look closely to the cause which has produced the evil or which keeps it up.

ARTICLE VI.

Letter from Dr. E. Townsend, *of Philadephia.*

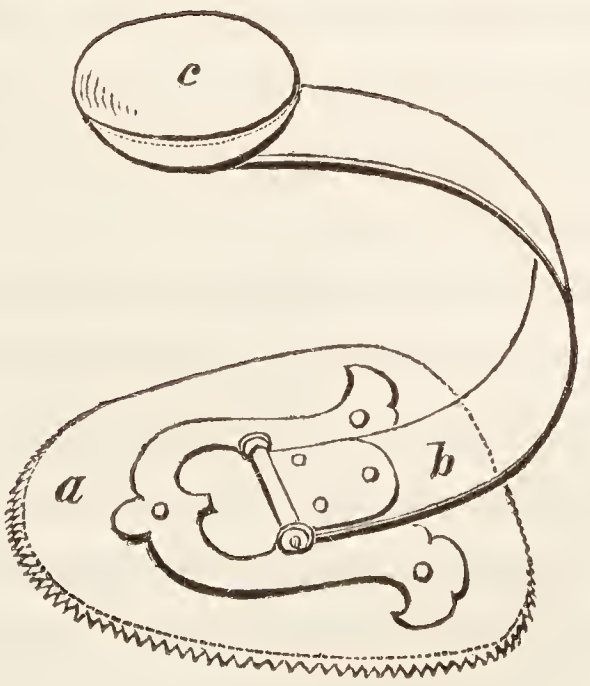
All who fill teeth will admit the necessity of not only having the cavity dry, previous to introducing the filling, but that the gold shall remain perfectly dry through the whole time of pack-

ing, indeed until the whole mass is *solid.* To do this, requires that the mouth should be kept open and still, for a considerable time, (if the filling be large,) and also that the salivary ducts should be stopped as effectually as possible.

In the under jaw this is sometimes very difficult, owing to the motion of the tongue, and the activity of the sub-lingual glands.

To remedy, in some measure, the difficulty, the fixture of which the annexed cut is a representation was invented.

Its manner of use is as follows: fold a small napkin so that it shall nearly fill the space between the bicuspides, and extending posteriorly as far as the middle of the tongue, pressing it down on the sub-lingual ducts as closely as possible, then lay the broad mouth piece marked *a* upon the napkin, and passing the spring backwards, rest the pad in the roof of the mouth, the force of the spring will be sufficient to keep the napkin in its place, and to keep the mouth dry, to the end of the operation, if all the steps have been carefully taken. In some very wet mouths there is great advantage in laying on the mouths of the ducts, a small roll of soft blotting paper, and then placing the napkin over it.



a, The silver plate to rest on the tongue—the edges are slightly turned down and serrated to prevent its sliding on the napkin.

b, Is a steel spring 2¼ inches long to the centre of the pad—working on a joint at its junction with the plate—of course it is understood that its position in the cut, is as it is in use, bent and pressing on the roof and tongue.

c, Is a small pad of cork, covered with silk—the width of the spring is is about one-third of an inch.

ARTICLE VII.

Letter from Dr. Wm. T. G. Morton.

Boston, August 25, 1847.

Messrs. Editors:

During the session of the late convention of dentists at Saratoga, I found that great interest was manifested in the history of the discovery of the mode of producing insensibility to pain under surgical operations, and a strong desire expressed to have this history fully and fairly set before our profession through the columns of its own proper Journal. This desire was expressed to me personally by several of our brethren, whose rank, at the head of the profession, entitled their intimations to great weight. Yielding to this, I present a statement of some of the chief incidents relating to the discovery, from the earliest, set forth somewhat in the narrative form. After the right to the credit of the discovery became matter of controversy, affidavits were collected, the originals of which were forwarded to the Academie des Sciences at Paris. Many of them will be found in a pamphlet, published by Mr. Edward Warren, in Boston, especially in the latest editions. They are, perhaps, too long to justify their being incorporated in this article, but I transmit such as are printed to your care, to be used as your discretion shall dictate.

In the year 1844, while in practice as a dentist, I desired to improve myself in chemical and medical knowledge, and entered the family and laboratory of Dr. Charles G. Jackson of that city, and devoted my spare time to study and experiments, under his supervision. Incidentally, in the course of conversation, I spoke of killing the nerves of teeth by arsenic, and expressed some want of confidence in the practice, as it often left a permanent soreness, arising from irritation of the lining membrane. Dr. Jackson told me, humorously, to try his tooth-ache drops, and on my inquiring what they were, told me that when in the practice of medicine, some years before, he occasionally pulled teeth for his particular patients, and in one instance, finding the

patient unwilling to bear the pain of an extraction, he applied ether to the tooth, to alleviate the pain, and with success. A friend of this person came to him soon after for some of his "tooth-ache drops," as he called them, but as he did not wish to engage in dentistry, he told the applicant that he had none. I made some inquiry as to the effect of ether on the system, and Dr. J. spoke of the students at Cambridge inhaling it from their handkerchiefs, and described the effect as stupefying and intoxicating. He offered to send me some of this ether, to try upon teeth, and did so, at the same time sending some to the most distinguished dentists in the city. In this conversation he made no allusion to any other effect of ether than what I have stated, and the accuracy of my statement as to this conversation is confirmed in Dr. J's own statement to Dr. Gould of Boston. I will add that the ether which Dr. J. sent me was chloric ether.

Not long after receiving this ether, I applied it to a sensitive tooth of a female patient, and found that by repeating the application for several days the irritation of the nerve was so far relieved that the tooth was filled without difficulty, and is now in good condition. By this experiment I became satisfied of the effect of ether when directly applied, in assuaging pain and deadening the nerve of a tooth. This was in the summer of 1844.

Soon after this conversation, the wife and aunt of Dr. Jackson were under my care for a series of severe dental operations, in which no little fortitude was needed. The first named lady sat in the operating chair several hours before the extraction of each tooth, showing uncommon sensitiveness, and begging to be mesmerised, or for any mode of alleviating the pain. Dr. Jackson was present at some of these sittings, and saw her distress, and often conversed upon the subject, but suggested no mode of alleviation or prevention.

My attention having been directed to the use of ether, by direct application, to sensitive teeth, I began to read upon the subject generally, and found that the inhaling of ether to produce stupefaction or intoxication was familiar among teachers and students, and that its effect was well known to be that of

an antispasmodic, anodyne and narcotic. Having some of the ether left which Dr. J. had sent me, I inhaled it from my handkerchief, but did not find that it produced any marked effect, probably from there being too little of it.

In the course of the summer, being unwell, I went into the country, at Farmington in Connecticut, and while there made experiments upon the effect of ether by causing birds and other animals to inhale it. I was disappointed in the effects produced, and as my experiments were known among my friends, I was somewhat mortified, and bottled the subjects, where they remain, I presume, to this day. The books I examined upon this subject were in part from Dr. Jackson's library, and were such as are well known to men versed in chemical science. On returning to the city in the autumn, I found that my business required my constant attention, and I was not able to pursue this subject any farther at that time.

In the winter of 1844-5, Dr. Horace Wells of Hartford, Ct., formerly my partner, came to Boston and asked me to aid him in getting an opportunity to try the effect of nitrous oxide gas in producing insensibility to pain under surgical operations. I cheerfully acceded to his request, and introduced him to Dr. John C. Warren, who invited his students to remain and hear Dr. Wells' remarks at the college; and in the evening Dr. Wells administered the gas at a hall in presence of the class, and extracted a tooth, but the patient screamed for pain, the students hissed and laughed, and the whole thing was a ludicrous failure. The gas administered was the nitrous oxide, and no allusion to ether was made by Dr. Wells to me, to the physicians, or to any one else that I ever heard of. Dr. Wells left town early the next morning without seeing me, and I did not see or hear from him again until the July following, when, being in Connecticut, I called upon him at Hartford for the purpose of adjusting our former partnership accounts. I found that he had given up dentistry and had been engaged in an exhibition of birds, his health having failed him. At the office of Dr. Riggs I spoke of the gas, but Dr. Wells gave me to understand that he had abandoned the experiment, being satisfied that it could be of no practical value.

My business had now become almost exclusively mechanical dentistry or plate work, and I was required constantly to extract a great number of teeth from the same patients, who suffered extremely, being often obliged to put off my operations and sometimes to abandon them altogether. I had a motive which few other men have, daily pressing upon me, to discover some mode of destroying or greatly alleviating pain under dental operations. I knew the effect of ether, when directly applied, to render a nerve insensible. I knew the effect of it, to some extent, when inhaled. I knew of Dr. Wells' attempt to produce insensibility to pain by means of inhaling nitrous oxide gas. It was not remarkable that I gave my attention to producing this result by other means, and that I tried the gas or vapor of ether.

In the course of this summer (1846,) a student came to my office by the name of Thomas R. Spear, who, finding that I was engaged on this subject, told me that he had inhaled ether when at school, and described to me its effects. I tried an experiment upon a water spaniel, forcing his head into a jar from which he inhaled the vapor. In a few minutes he wilted down in my hands, and became apparently lifeless. He then sprang up, yelled, and leaped to some distance. This experiment incited me to go forward. I made a contract with Granville G. Hayden, a young dentist, to take the entire charge of my business, that I might give myself unreservedly to this subject. The contract was drawn on the 30th June, 1846, by Richard H. Dana, Jr., Esq., and is now in his possession. In a published letter, addressed by him to Mr. Warren, he states his recollection of the object I had in view, as explained by me to him at the time.

As soon as Dr. Hayden became established in my business, I continued my experiments. I first inhaled chloric ether with morphine, as described in the report of Dr. H. J. Bigelow, but the effect was only drowsiness, followed by lassitude and headache. Early in August Dr. Hayden, at my request, procured me a four ounce vial of sulphuric ether from Burnett, a druggist much relied upon by chemists. I tried to induce Dr. H. to inhale it, but he declined. I took half of it into the country to

repeat the experiment upon my dog, but he sprang and overset the jar. Being somewhat out of patience, I resolved to take it myself, and inhaled the other half from my handkerchief. I was somewhat insensible, but not entirely so; still there was effect enough produced to encourage me. As Mr. Burnett's shop is near my rooms, and his young men are intimate with my students, I preferred not to send there again for ether lest he should learn what I was about; so I sent a student, Wm. P. Leavitt, to a druggist, in another street, who sent me a quantity of sulphuric ether, which has since been analyzed, and turns out to have been far from pure, containing large quantities of alcohol, sulphur acids, and other impurities. Not knowing this to be the case, I requested Thomas R. Spear, a student, to inhale it. As he had done so at school, he consented. The effect was at first drowsiness and torpor, followed by extreme excitement and violence. It was necessary to hold him down in his chair. Leavitt also took it, with very much the same effect. These experiments discouraged me. The results were not what I desired, nor what the experiments upon myself and on the dog led me to hope might take place.

It is important to remark here, that had the ether I used at this time been pure and highly rectified, I should unquestionably have demonstrated the great truth then, instead of on the 30th September, as I shall hereafter state.

Early in August I went into the country for health and recreation, and did not return to my labors until the middle of September. As it had occurred to me that more satisfactory results might be produced by a more appropriate inhaling apparatus, I called frequently upon Mr. Wightman, a philosophical instrument maker, for the purpose of contriving something. While examining his bags for inhaling the exhilarating gas, it struck me that by making an opening for admitting atmospheric air, to be closed by a valve, I could convert one of these into an inhaling apparatus. I asked Mr. W. if ether would dissolve India-rubber. He thought it would. I asked him if it would dissolve oiled silk. He said he did not know, but advised me to consult a chemist, and named Dr. Jackson. I got a glass tunnel from

Mr. Wightman, purchased an India-rubber bag, and returning to my office sent W. P. Leavitt to Dr. Gay, a chemist, to ask the simple question, whether ether would dissolve India-rubber? Dr. Gay was out. I became satisfied that my glass and bottle were too small for my purposes, and said to Dr. Hayden that I would step into Dr. Jackson's laboratory and get a gas-bag. Dr. H. suggested to me to ascertain from Dr. Jackson something with reference to the properties of ether. I said that I would do so, if I could without letting Dr. J. know what result I was endeavoring to produce. I went to Dr. J's laboratory to procure a gas-bag, at all events, and with the further intention of getting information from him as to the preparations and kinds of ether, if I could do so without making known to him my whole purpose. I know that some may consider this course unworthy of one engaged in a philosophical inquiry and seeking only for truth. But, on the other hand, it may justly be said that I had devoted time and money, and made great sacrifices for this object, and felt that I needed only a little specific information, which any well informed chemist could give me, and which I was willing to pay for. I had an arrangement with Dr. Jackson, ever since I studied with him, as to occasional advice I might ask of him; yet, by asking this advice, I might enable another man possessed of the requisite scientific information to avail himself of my labors and ideas, and just to come in between me and my results.

I asked Dr. J. for his gas-bag. He told me it was in his house. I got it, and returned through the laboratory with the bag in my hand. Dr. J. said, laughingly—Well, doctor, you seem to be all equipped, minus the gas. I replied, in the same vein, that there would be no need of gas, if I could make the man who took it believe he was taking gas; that imagination would do every thing, and alluded to the story of the man who died from being made to think he was bleeding to death, when there was only water trickled down his leg. Dr. J. said, that was a good story, but added, in a graver manner, that I had better not try that experiment, lest I should be set down as a greater humbug than Wells was with his nitrous oxide gas.

Finding the subject open, I said, in as careless a manner as I could assume, why cannot I use the ether gas? He said that I could do so, and spoke again of the effect of it upon the students at college, and said it would make the patient stupified and torpid, so that I could do what I pleased with him, and that he would not be able to help himself. I asked him then as to the kinds and preparations of ether, and supposing that if he had any it would be the best, I asked him to let me see his. He did so, but said that his had been standing for a long time, and recommended me to get some at Burnett's, who, he said, had it highly rectified and pure. As I went out, he told me he could supply me with something better than the gas-bag, and gave me a flask with a glass tube inserted in it.

Procuring the ether from Burnett's, I shut myself up in my room, seated in the operating chair, and commenced inhaling. I began to feel the effects, looked at my watch, and soon lost consciousness. As I recovered, I had a dreadful sensation like that of nightmare, and would have given the world for some one to come and arouse me. At one time I feared I should die in that state. Gradually, as consciousness returned, I found there was numbness and insensibility in my limbs, and bringing my fingers together, and pinching my thigh, I found there was no sensation. I then looked at my watch, and saw that I had been in that state between seven and eight minutes.

Finding every indication of a complete and successful experiment, I waited impatiently for some person upon whom I could perform an operation. At the latter part of the afternoon a man by name of Eben. H. Frost, who lives in Prince street, called and wished to have a tooth extracted, but seemed to dread the operation, and asked if he could not be mesmerised. I told him I had something better, and gave him the ether. His insensibility was perfect, and I drew from him a firmly rooted bicuspid tooth. He knew nothing that had been done, until the tooth was shown to him. Dr. Hayden and Mr. Tenny of the Journal office were present. This was on the evening of the 30th September, 1846, and I believe it is not questioned that this is the first successful experiment upon the inhaling of

ether to produce insensibility under operations upon the human frame.

It may not be improper for me to make a remark, here, upon the conversation with Dr. Jackson. I do not recollect to have originated all knowledge and all ideas on this subject. I derived from Dr. Jackson, in 1844, the information that ether directly applied to a sensitive tooth would gradually produce insensibility of the nerve, and this I corroborated by experiment. At the same time he spoke of the effect of ether when inhaled, but the effects he described were only such as were detailed in the books, and well known to teachers and students. I knew of Dr. Wells' attempt to produce insensibility under surgical operations by means of nitrous oxyde gas. I had a motive for endeavoring to produce this insensibility, or, at least, the highest possible degree of alleviation of pain under dental operations, which few other persons had. It was owing to circumstances creating this strong motive, aided by the impression I had obtained, that I gave my mind to the subject, and worked out the result, demonstrating a truth, the extent and power of which have been as astonishing to me as to the rest of the world. I am ready and desirous to acknowledge my obligations to all persons from whom I have received any aid. I am indebted to Dr. Jackson, also, for information as to the best kinds and preparations of ether. But my obligations cease here. Dr. Jackson gave me no information which I could not have obtained from other well informed chemists, and from some books. He described the state which inhaling the ether would produce, as stupefaction, intoxication, torpor, and the like; effects known to scientific and medical men, but gave no intimation of the result which was actually produced, and which, alone, creates the wonder and usefulness of the discovery. His conduct at the time, and subsequently, and the affidavit of Mr. Eddy, show, conclusively, that he had not this idea or suspicion on his mind. If my experiment had produced no other result than he anticipated, it would not have been, as he evidently thought it was not, worth troubling one's-self or the world about. I knew of Dr. Wells' experiment, but this was

not knowledge confined to myself, it was known to Dr. Warren, Dr. Heywood, Dr. Jackson himself, and to many physicians and students in Boston. But Dr. Wells did not allude to ether, as the surgeons he conversed with are well aware, and have stated. My position is simply this: that under the influence of a sufficient motive, and aided by ideas and facts, obtained as I have stated, of my own motion, and at my own risk, I followed up the subject and demonstrated the truth.

I waited one day after the experiment upon Mr. Frost, and called upon him to see how he was affected. Finding him perfectly well, I determiued to introduce the discovery into immediate use. My chief difficulty was, in inducing persons to try it. Mr. Frost's certificate was not enough, as he was a person unknown. I, therefore, called on Dr. Jackson, told him what I had discovered, and asked him to give me a certificate that the inhaling of this ether was harmless. He positively refused to do so, and took no part or interest in the matter. I thought then, and am now firmly persuaded, that he paid but little respect to my announcement, attributing the effect I described to imagination, or exaggeration, or both. I then called on Dr. Warren, stated to him my object, and obtained an invitation to administer it at the hospital.

During the interval between this invitation and the time appointed for the operation, I made several experiments at my office with various results. In some cases I failed, and in others a mixed and unsatisfactory result was produced, and I gave my attention to the mode of administering, and to the admission of atmospheric air. On the night before the operation at the hospital, I became very anxious, and consulted my friend Dr. Gould, a physician, who has paid much attention to chemistry, who gave me valuable assistance, suggesting an antidote in case of unfavorable effects, and recommending to me the valvular system instead of that which I had before used. From early daylight I was employed with Mr. Chamberlain, the instrument maker, until past ten o'clock, and hurrying to the hospital, reached the room just as Dr. Warren, despairing of my arrival, was about to commence the operation. The detailed

account of this experiment is to be found in the communications and reports of the surgeons. It is enough to say that it was successful, and that Dr. Warren announced to the students his belief that there had been entire insensibility to pain.

The next day I administered the ether in an operation for a tumor, by Dr. Heywood, and with perfect success. I continued to administer it in my office, and early in November applied to Dr. Heywood for leave to administer it in a case of amputation, which I learned was to take place at the hospital. The surgeons informed me that they thought it their duty to decline using my preparation until informed what it was. I immediately addressed a note to the senior surgeon, informing him that the substance was sulphuric ether. The amputation took place on the 7th November. It was still undecided whether I should be admitted, and Dr. H. J. Bigelow, who interested himself a good deal in my favor, took me to the hospital, where I awaited the decision in the anteroom. Being admitted, I gave the ether with perfect success. This was the first case of a capital operation. Dr. Jackson knew nothing of this operation, being out of the city at the time, and was in no way connected with the business to the knowledge of the surgeons. On the 21st November, I administered the ether again, in an operation for a tumor, at the Broomfield House, in the presence of a number of medical gentlemen, among whom was Dr. Jackson. This was the first time Dr. J. had seen the ether administered, and no one had then administered it but myself. In this instance he was merely a spectator among others. On the 2nd January, 1847, Dr. Jackson called at the hospital, and recommended oxygen gas as a remedy for asphyxia, which he heard was produced by the ether. But the surgeons told him that they had long been satisfied that asphyxia was not produced. With the exception of a single intimation mentioned in Dr. Warren's communication, this was the first time the surgeons at the hospital knew or saw Dr. Jackson in connection with this discovery. They had no reason to suppose that he had any connection with it, and his conduct and conversation with various persons in the interval between

the 30th September, and the full and acknowledged establishment of the discovery, shows, abundantly, that he did not then wish to be identified with it. I have made no regular effort to procure this evidence, and as much of it is conversation, gentlemen are unwilling to volunteer testimony upon it. And I will remark here, once for all, that until the return from Paris of Dr. Jackson's communication to the French Academy, in which he took to himself the entire credit of the discovery, not mentioning my name, that I had any suspicion that my right as discoverer was disputed, or that I had a rival in the field. I, therefore, took no pains to secure evidence in the early stages of the discovery, and much that I now have has come in almost accidentally, piecemeal, and volunteered. I have not yet made a thorough collection of evidence, but am authorised to say that there is some at my disposal of a conclusive character, which I am not at liberty to use, unless it shall be absolutely necessary. Indeed, so entirely was Dr. Jackson disconnected with the discovery, that had it failed, none of the ridicule would have been attached to him, and had a life been lost, or any serious injury been done, none of the odium would have fallen upon him, nor could he have been made in any way responsible. It was not until after the formidable opposition organised against it had become powerless, and success was certain, that Dr. Jackson began to bring forward his claims as a discoverer.

On the 17th October, I addressed a letter to my former partner, Dr. Wells, informing him of what I had done, and inviting him to come to Boston and assist me in bringing the discovery into use. He replied by a letter of October 20th, speaking encouragingly of my discovery, and saying that if the gas will produce the effect I named, it will be a fortune to me, and intimating no claim to a prior discovery. His letter is printed and transmitted with this article. In a few days he came to Boston, saw a number of operations in my office, in the early stage of the discovery, was told freely, and could discern by the smell, that it was ether I used, yet gave no intimation of having used it himself. On the contrary, he seemed disappointed with the results, expressed a fear of the consequences, and said that I

should kill some one, or, at all events, injure myself very much in my business. He left Boston, and soon went to Europe. While there the fame of the discovery reached him, and then, for the first time, he put in a claim for the merit of a discovery, professing not to know that I made pretensions to the same honor. I have the authority of several surgeons for saying, that he did not allude to ether when in Boston, in 1845, and of Dr. Geo. Hayward for saying that Dr. Wells, since his return, admitted to him that he had never made any experiment with ether.

I feel bound to make an explanation on the subject of the patent which I obtained. My intention had been chiefly to discover something which I could use to advantage in dental operations. The other uses to which it could be put were collateral to my purpose, and I had no desire to interfere with them. But I was advised that if I did not procure a patent, my discovery and the instruments by which I administered the ether would be used by other dentists, while I, who had devoted my time, money and labor to it, and had run all the risks and encountered all the opposition, odium and ridicule, would receive no greater reward than they. I did not at the time fully realize the manifold uses and extraordinary powers which have since been developed. I was also advised that this would be a dangerous instrument for evil, and that public policy would be subserved by confining the use to responsible persons. I immediately presented the right to all charitable institutions in the United States, together with apparatus to many of them, and made it known that I would give every facility for its use for the smallest compensation in surgical cases, and would sell rights to dentists for a consideration which all would admit to be reasonable. My object was to secure to myself a reasonable return for the discovery and for all that I had undergone and risked in its prosecution. I can sincerely say that I now regret having taken this step, but a man's motives should not be judged by the result; he must be judged according to the circumstances under which he acted. As I have now abandoned all intention of adhering to the patent, I wish also to have the result of my efforts understood. So far from having gained, I have been a

pecuniary loser by this discovery. It took me from my business, which I was obliged to confide to other hands, involved me in outlays bringing no return, and in personal controversies, and now the discovery is freely used by those very persons whose opposition caused me for a time so much loss and inconvenience.

If the question is asked, how Dr. Jackson came to be associated with me in the patent, I refer the reader to the letter of R. H. Eddy, Esq., the patent agent, in answer to one addressed to him by the surgeons of the hospital, which developes the history of that transaction in a manner which I cannot doubt will be satisfactory. From that letter it will appear that Mr. Eddy had but a slight acquaintance with me, and was an intimate friend of Dr. Jackson, having perfect confidence in him and a strong interest in his success. When Dr. Jackson found I was to get out a patent and heard that I was likely to make a great deal of money from it, he made me a professional charge for advice as to the preparations of ether, &c., which he had given me. Mr. Eddy then suggested to me that instead of paying Dr. Jackson a fee, I should allow him a small interest in the patent. He gave as a reason for this that I should thus have the aid of his name, which would be a great help to me in the opposition then directed against me, and give a scientific character to the discovery, and chiefly because Dr. Jackson would then have a motive for giving his attention to the subject, would suggest improvements in the application and preparation of the ether, and keep in advance of the improvements which might be made by others. I felt the need of all aid I could get in my then situation, and the want of that scientific skill which intense competition would render necessary to the value of the patent, and agreed to substitute a share in the profits of the patent for a fixed fee. Mr. Eddy also had another motive for securing Dr. Jackson. He knew that the patent would inevitably be contested, and that Dr. Jackson would as certainly be a witness at any trial that might take place. At that time he knew but little of the history of the discovery, and from his general confidence in Dr. Jackson, was inclined to magnify his share of

the business. He therefore inferred that Dr. Jackson's testimony in court, and statements out of court, would be of such a kind as might give a handle to the opponents of the patent to deny my exclusive right, and at least to embarrass the cause. He therefore thought it would be good policy for me to admit him into the right. Mr. Eddy states that I protested against admitting Dr. Jackson to have been a joint discoverer, but that my objections were overborne by his arguments and by his opinion, which he then entertained, that Dr. Jackson, by reason of the advice he gave me, was entitled to a share in the merit of discovery. I was entirely ignorant of the principles of patent law, and knew that Mr. Eddy had made that his chief study and his sole business. I therefore reluctantly assented to the arrangement. Mr. Eddy now says, distinctly, that if he had then known the history of the transactions between Dr. Jackson and myself, he not only would not have advised, but would not have permitted Dr. Jackson's name to be associated with the discovery. I respectfully request the attention of every reader to this letter, as well as to that of Mr. Caleb Eddy upon this particular point. They are to be found in the later editions of Mr. Warren's pamphlet, and are transmitted with this communication.

W. T. G. MORTON.

"*Hartford, (Conn.,) Oct.* 20, 1846.

Dr. Morton:

Dear Sir—Your letter, dated yesterday, is just received, and I hasten to answer it, for fear you will adopt a method, in disposing of your rights, which will defeat your object. Before you make any arrangements whatever, I wish to see you. I think I will be in Boston the first of next week—probably Monday night. If the operation of administering the gas is not attended with too much trouble, and will produce the effect you state, it will, undoubtedly, be a fortune to you, provided it is rightly managed.

Yours, in haste,

H. WELLS."

Correspondence between the Surgeons of the Massachusetts General Hospital, and Caleb Eddy, Esq., and Mr. R. H. Eddy.

Since writing the foregoing, the wish therein expressed has

been gratified; and, by the kindness of Drs. Hayward, Townsend, Parkman, and Bigelow, surgeons of the Massachusetts General Hospital, I am permitted to lay before the public the following correspondence between them, and Caleb Eddy, Esq., and Mr. R. H. Eddy. As these communications will speak for themselves, I need not add any comments, but will give them at once, merely expressing the pleasure it affords me, thus to be able to adduce a kind of testimony which cannot fail, as it seems to me, to carry conviction to the minds of the most incredulous. This correspondence affords me the means of corroborating many of my foregoing statements.

The subjoined is the letter from three of the surgeons, Dr. Bigelow having addressed a separate note to the same effect, which, therefore, I will omit:—

Boston, May 18, 1847.

Caleb Eddy and R. H. Eddy, Esqs.

Gentlemen,—The undersigned, having been informed that you are in possession of important information relative to the discovery of the new property of sulphuric ether, and of its subsequent history, are desirous that you should, at your earliest leisure, furnish them with such an account of the matter as will elucidate so important a subject.

They will thank you to state how the names of Dr. Charles T. Jackson and Dr. W. T. G. Morton became associated in the letters patent; what share each had, in your opinion, in making the discovery; and any other facts you may choose to communicate tending to the same end.

GEO. HAYWARD,
S. D. TOWNSEND,
SAMUEL PARKMAN,
Surgeons of the Massachusetts General Hospital.

Boston, May 24, 1847

To Drs. George Hayward,
S. D. Townsend,
Samuel Parkman,
Henry J. Bigelow,
} Surgeons of the Mass. General Hospital:

Gentlemen,—Your favors of May 18th and 20th, addressed to myself and Mr. R. H. Eddy, have been received. As I presume any reply I may make will be made public, I would take the occasion to remark, that, were it not that there now seems no possibility of the controversy existing between Drs. W. T. G. Morton and C. T. Jackson being settled by mutual arbitrament, owing to the refusal of the latter to submit the same to a reference, I should feel an indisposition to make any relation of what came under my notice relative to the discovery in ques-

tion. I have no wish to rob Dr. Jackson of any honor to which he may be properly entitled, and am governed by no interest further than a desire that he to whom the world is really indebted for making the discovery may receive that reward to which he is justly entitled.

On the evening of Friday, October 23, 1846, Dr. Charles T. Jackson visited my house. During the evening, I requested him to relate to me the particulars of the new discovery for prevention of pain in surgical operations. He stated to me, that Dr. W. T. G. Morton called on him near the latter part of last month to obtain the loan of a gas-bag, which he said it was his intention to use for the purpose of administering atmospheric air, or something else, to a patient to quiet her fears in order that he might extract one of her teeth: that he informed Dr. Morton that his gas-bags were in the attic story of his house, and it would be attended with some trouble to procure them: that Dr. Morton stated that he was desirous of operating on the imagination of the person in some such way as was said to have been practised on a criminal condemned to death, viz.— by suffering warm water to trickle upon and from some wounded or lanced part of the body, while the eyes of the person were bandaged. Dr. Jackson stated, that he told Dr. Morton that such an experiment would prove a failure, and he would be ridiculed for making it; that he had better let her breathe some ether, (if he could induce her to inhale it,) which would put her to sleep, and then he could pull her tooth, and she could not help herself, or could not prevent him by any resistance: that Dr. Morton inquired of him as to the danger and mode of using it. He replied to him, that he might saturate a sponge or cloth with it, and apply it to her mouth or nose. After Dr. Jackson had related the above, I said to him, "Dr. Jackson, did you know at such time, that, after a person had inhaled ether, and was asleep, his flesh could be cut with a knife without his experiencing any pain?" He replied, "No! nor Morton either: he is a reckless man for using it as he has; the chance is, he will kill somebody yet." This is all, or nearly all, of any importance, that I now recollect in relation to the discovery, previous to the application for the patent in which the names of Drs. Morton and Jackson were associated.

With respect, your obedient servant,

CALEB EDDY.

Commonwealth of Massachusetts,
County of Suffolk, City of Boston.

Be it known, that, on this twenty-ninth day of May, Anno

Domini eighteen hundred and forty-seven, before me, the undersigned, a notary public, within and for said county and city, duly commissioned and sworn, came Caleb Eddy, and made solemn oath that the foregoing statement, by him subscribed, is true. The said Caleb Eddy is well known to me as being one of the most respectable and trustworthy citizens of said Boston.

In witness whereof, I have hereunto set my hand and seal notarial.

JOHN P. BIGELOW, *Notary Public.*

Boston, May 22, 1847.

To Drs. Geo. Hayward,
S. D. Townsend,
Samuel Parkman,
H. J. Bigelow,
} Surgeons of Mass. General Hospital:

Gentlemen,—I have received your communications of the 18th and 20th instant, in which you state that you have understood me to be "in possession of important information relative to the discovery of the new property of sulphuric ether, and of its subsequent history," and are desirous that I should "furnish such a statement of the matter as will elucidate so important a subject;"—also, "to state how the names of Drs. C. T. Jackson and W. T. G. Morton became associated in the letters patent, and what share each had, in my opinion, in making the discovery." "Also, any other facts I may choose to communicate tending to the same end."

The friendly relations which, for many years, have existed between myself and Dr. C. T. Jackson, have heretofore caused me to refrain from making known many facts in my possession in relation to the late discovery of the new effect of sulphuric ether. The difficulties, between him and Dr. W. T. G. Morton, I hoped to see settled by an impartial reference—one, where the evidence, produced by both parties, could be subjected to a rigid examination, in order that truth might be elicited, and strict justice rendered to whichever of those gentlemen such a tribunal should accord the chief merit of making the discovery. I have earnestly recommended Dr. Morton, whenever an opportunity has presented, to induce Dr. Jackson to submit the matter of the discovery to such a reference. Accordingly, it was a cause of much gratification to me to learn that a proposition of Dr. Morton to do so, had received the favorable consideration of Dr. Jackson. I find, however, my anticipations have not been realized. Dr. Jackson, after having consented to refer the case, and after delaying, a long time, to agree on a suitable umpire, has, as I learn, utterly refused to

submit his claims to a just arbitration. Under such circumstances, I feel it a duty to make known to you a few facts. My business engagements prevent me from stating a particular history of much that has come under my observation in relation to this matter. I shall, therefore, endeavor to confine myself to a simple statement of what I was witness to, from the time I first heard of the discovery until a patent was applied for in this country.

Within a few days of Sept. 30, 1846, I think the 1st of October, Dr. W. T. G. Morton called on me at my office, stated to me that he had made an important discovery, by which he could extract teeth without pain, and desired to learn from me whether it could be secured by a patent. After replying to him that he must state the nature of it, before I could render him any definite opinion, he informed me, that he used sulphuric ether, by administering it by inhalation in a state of vapor. He mentioned, that he had extracted a tooth without the patient being sensible of the operation, and that, on awakening from the sleep into which he had been thrown, he was much surprised to find his tooth drawn and lying on the floor.

I stated to Dr. M. that, as to the patentability of the discovery, I had some doubts; but that I would consult the law, and the various legal decisions on the subject of patents, and advise him of the result. After this, I saw Dr. Morton not more than once, I think, if once, until Wednesday, the 21st day of October. In the mean time, I had read several articles in the newspapers relative to the experiments performed at the Massachusetts General Hospital, and had understood, from Dr. Charles T. Jackson, that he had had some connection with Dr. Morton in making the discovery. My reflections on the subject led me to the belief, that a patent could be obtained in this country, and on the 21st day of October, Dr. Morton having called at my office, I so informed him. I stated to him that, from what I had learned from Dr. Jackson, I considered the discovery to be a joint one, and that the patent, if applied for, must be conjointly by him and Dr. Jackson. In rendering such advice, I was fully impressed with the belief, from the statements of Dr. Jackson, that he, Dr. J., had suggested to Dr. Morton the propriety of experimenting with ether,—that Dr. Morton, without the presence or further assistance of Dr. Jackson had practically demonstrated the effect of ether to annul pain. Upon this I reasoned, that, had Dr. Morton kept the discovery secret, neither Dr. Jackson nor the world would have known of the result; or, in other words, had Dr. Morton not

performed the experiment that he did, the discovery made could not have taken place;—also, that had not Dr. Jackson given Dr. Morton the *idea* of using ether, neither Dr. Morton nor the world would have known of the discovery. It seemed to me to be a clear case of joint invention or discovery. Dr. Jackson had admitted to me that he had never performed a surgical operation of any kind on a patient, under the influence of inhaled ether.

In reply to my remarks to Dr. Morton, he stated that he did not know by what right Dr. Jackson should have any interest in the patent, as he (Dr. M.) had an understanding with Dr. Jackson to fully remunerate him for any advice he might have rendered him. In order to satisfy myself more fully as to the position of Dr. Jackson in this discovery, and the understanding between him and Dr. Morton, I called at the office of Dr. Jackson the next morning. I cannot recollect the precise conversation which ensued at this interview, but the substance of it was, that Dr. Jackson informed me that, by the laws of the Massachusetts Medical Society, he would be prevented trom joining with Dr. Morton in taking out a patent, as he would be expelled from the association if he did so. He further stated, that he intended "to make a professional charge of $500" to Dr. Morton, for the advice he had given him, and that Dr. Morton had acceded to this; that he did not wish his name connected with Dr. Morton's in any manner; that Dr. Morton might take out a patent if he desired to, or do what he pleased with it. I made inquiries as to the assistance rendered Dr. Morton, and asked Dr. Jackson if he had ever tried any experiments to practically demonstrate the fact that the inhalation of ether would prevent pain during a surgical operation. He informed me that he had not. I am fully persuaded that Dr. Jackson, at this time, thought the whole matter of little value or importance. The conversation I had with him led me to this belief. He supposed Dr. Morton might realize something from it in his business of dentistry, and was willing that he should do what he pleased with it, so long as he did not couple his (Dr. J's) name with it. I afterwards inquired of Dr. Morton whether he had agreed to give Dr. Jackson $500 for the assistance rendered, as well as for all the Doctor's interest whatever in the discovery. He said that he had, and that he had agreed to pay him at the rate of *ten per cent.* on the sale of licenses, until the $500 was paid.

On Friday evening, Oct. 23d, on my return to my residence after a visit to the theatre, I found Dr. Jackson in conversation with my father, Caleb Eddy, Esq., and waiting to see me. At

this interview, I urged Dr. Jackson to waive his objections to associating with Dr. Morton, as I was confident that he was mistaken in his views of what would be the action of the Medical Association; that Dr. Morton could not properly take out a patent without him; and that, by joining in the patent, he would, of a certainty, be obtaining *credit as a discoverer;* whereas, should he not do so, he might lose all credit, as in the case of the Magnetic Telegraph, which I had understood from Dr. Jackson he had suggested to Professor Morse.

The next day, or within a few days after, I called on Dr. Augustus A. Gould, to learn from him the nature of the rules of the Medical Society. Dr. Gould I knew to be a personal friend and a well-wisher of Dr. Jackson. He exhibited to me a copy of the by-laws, in which I found they only provided, so far as I could see, that no member should deal in *secret remedies.* I perceived at once from them, that no objection could arise to Dr. Jackson's patenting any invention he might make, as it would cease to become *secret* the moment it might be *patented.* I understood Dr. Gould to coincide with me in my views. After preparing the specification, I submitted it to Dr. Jackson, who fully approved it. I next had it copied in a manner suitable to be signed and sworn to by the parties.

I recommended to Dr. Morton to allow me to insert, in the written agreement to be made between him and Dr. Jackson, ten per cent. on all sales of licenses, instead of ten per cent. until the amount to be paid would reach $500; advised him to be liberal towards Dr. Jackson, both in giving him credit, and a chance of profit. In this, I was governed by a sincere desire to benefit Dr. Jackson, while, at the same time, I supposed I was doing my duty to Dr. Morton, as I believed it would be for his interest to do so. I thought the chemical science of Dr. Jackson would be brought to improve the article used, or to produce a better quality of ether than could be found in the market; that his association with Dr. Morton would give immediate character to the discovery, and his future advice might be of great service to Dr. Morton.

My views seemed to strike Dr. Morton very favorably, and he acquiesced in them.

Here I would remark that he (Dr. M.) had never *informed* me of any experiments with ether, which I have since understood he made previous to his obtaining advice in relation to it from Dr. Jackson. This I can readily account for, as I saw very little of him, from the 21st to the 27th of October, the latter being the day on which the papers for the application for the patent were executed by the parties.

Dr. M. was so much engaged in his discovery and business of dentistry, that I found it exceedingly difficult, if not impossible, to obtain an audience with him. His office was constantly thronged with persons in waiting to consult him on professional and other business. Had Dr. Morton, during this time, stated to me what I have since read in the affidavits of Dr. G. G. Hayden, Messrs. W. P. Leavitt, T. R. Spear, Jr. and F. Whitman, I am confident I never should have advised him to associate Dr. Jackson in the discovery or patent, as I should have concluded that his friendly intimacy with Dr. Jackson had led him to visit him, as the readiest manner of obtaining certain chemical information respecting ether and its properties, which might be found in various scientific or medical works not conveniently accessible to him.

I should have considered that the idea of using ether was an original one with Dr. Morton; that he had, by a practical application of it, made the discovery that it would annul pain under the operation of a surgical instrument; had been the first to publish this to the world, and under peculiar circumstances, in which he had developed much of that remarkable energy of character we often find to belong to most great inventors, who are generally obliged to stem a powerful current of difficulties and risks, in order to impress on the community the importance of their discoveries. With such views, I do not hesitate to affirm that I should have accorded the discovery to him.

On Tuesday morning, the 27th of October, Drs. Morton and Jackson executed the papers for the American patent. While Dr. Jackson was passing from his office to my own, I informed him that I had seen Dr. Gould, and he had shown me the laws of the Medical Association; that Dr. G's opinion and mine coincided as to what was meant in them by the prohibition of secret remedies; that such could not be *patented* ones, as *they* (the latter) could not be secret. He replied, "Well if Dr. Gould thinks so, that settles the matter with me. I have no objections to signing the papers with Dr. Morton." I think I give nearly, if not exactly, the words made use of by him.

I would here remark, that I had found Dr. Jackson tinctured with old and exploded prejudices against patents, and I labored to remove them. So successful was I, that he subsequently informed me, that, after a consultation with a distinguished chemist at the south, he had resolved to secure every invention he might hereafter make; and, in accordance with such views, he sent me the specification of an alleged improvement in preparing a certain article for dentistry purposes, with the view of

filing a caveat and taking out a patent on the same. His disinclination to associate with Dr. Morton, in a patent, arose from no disposition, ever evinced to me, to give the public a *gratuitous* use of the discovery. The most important objection to his taking out a patent arose from what he supposed would be the action of the Massachusetts Medical Association.

In conclusion, I would remark that I have endeavored to state a few facts relative to the early discovery of the effect of sulphuric ether in surgical operations. In doing so, I am influenced by no other motives than to render justice to whom it may be due. It is a matter of indifference to me to whom the world may ultimately accord the merit of being its benefactor for having given to it the great discovery in question. Dr. Jackson has been my personal friend for many years. With Dr. Morton, I have had, comparatively, but little acquaintance, never having seen or known him previous to my introduction to him while he resided in the family of Dr. Jackson. My sympathies would naturally tend towards Dr. Jackson; but personal friendship, private character, or scientific attainments, are matters which, it seems to me, ought not to prejudice me or any one else in favor of or against either of the claimants, when judging of the merits of their respective claims.

Yours respectfully,

R. H. EDDY.

Commonwealth of Massachusetts,

County of Suffolk, City of Boston, ss., June 18, 1847.

Then personally appeared the above-named R. H. Eddy, and being duly sworn, did declare that his statements, contained in the foregoing letter, by him subscribed, are true, according to the best of his recollection, knowledge, and belief.

Before me,

JOHN P. BIGELOW, *Justice of the Peace.*

ARTICLE VIII.

Inhalation of the Vapor of Sulphuric Ether for the relief of Pain in Surgical Operations—Dr. Morton's Claims to its Discovery.

Ever since the world was peopled, and man was endowed with a nervous organization; ever since pain was known to be painful, and human suffering was recognised as unpleasant,

whatever would have a tendency to mitigate, or entirely subdue this "curse upon mankind," without producing a corresponding evil, has been a "consummation devoutly to be wished."

Philosophers have sought for it, but found it not. Philanthropists have yearned for its discovery with almost a religious zeal, and men of science have investigated in vain for the boon; nothing but some poor obscure foreshadowings of the mighty truth, nothing but a few blind intimations of the great desideratum have as yet been vouchsafed to man. Men have steeped their bodies in alcohol, until they were only arrested in the *experiment* by "spontaneous combustion!" They have soaked their systems in opium, and with its fumes have smoked their brains until they were literally tanned, and withered to a knot, in the vain hope of drinking of the waters of Lethe, without paying to nature the penalty of her broken laws. Still, in spite of this want of success, the march of discovery has been onward, and though ages have rolled over our heads and still found us ignorant, if we are to believe what is told us, it has been reserved for this latter day to be immortalized, in the discovery of the long hoped for *Letheon!* The cry of "land!" has been heard, and we are *told* the "new world" is before us! We are told that when sulphuric ether is inhaled into the lungs under peculiar circumstances, the whole nervous organization becomes insensible, even under the most severe surgical operations, and that after which, it recovers itself without suffering the least danger or inconvenience.

It is unnecessary for us, at this time, to speak of the manner in which this declaration has been received either on this or the other side of the Atlantic, nor does it become us to enter the field of combat to decide "who is the discoverer!"

Let it be sufficient for us as Editors of a Journal, devoted to the interests of a profession, for which the discovery in question promises especial and incalculable benefits, to inquire into the merits of the case, and see how far common prudence and common sense, will justify us in endorsing and recommending it to those who look to us with their confidence. Thus far we have deemed it prudent to say but little on the subject, a sense

of justice, at least, would induce us to withhold passing judgment upon it hastily, or until a sufficient time had elapsed to have its character and influence fully known. Acting upon this principle, then, there can be now no longer reason for our withholding an article on the subject from our readers.

First, then, let us consider the article used, which is *sulphuric ether*. What is sulphuric ether? Sulphuric ether is obtained by distillation from a combination of sulphuric acid, alcohol and potassa. It is a colorless liquid, of a hot, pungent taste, has a strong affinity for oxygen, exceedingly volatile; when applied to the animal economy, and allowed to evaporate freely, it acts as a severe refrigerator, but when the evaporation is checked or protracted, it acts as a powerful stimulant—even producing resuscitation. Ether has ever been regarded as one of the most powerful, stimulating and dangerous narcotics in the whole materia medica. In its *administration*, the volatile gas arising from its evaporation is received into the lungs, and takes the place of the ordinary air we breathe.

Secondly. What would we naturally expect to be its influence on the human system under such circumstances? When received into the lungs, from its peculiar chemical properties we would expect it to cause burning and suffocating sensations from the elevated temperature produced by its evaporation in its confined situation. From its stimulating qualities, and accelerated or increased pulsation, either in rapidity or volume, together with an unusual distension of the blood vessels of the lungs, and, from our previous knowledge of its effect on the brain, we would naturally expect a similar influence there; at least, we should be justified in apprehending the worst results, especially, as death has been repeatedly produced by the inhalation of ether, long before its power to produce insensibility to pain was known.

Thirdly. What *is* its influence? Its immediate effects are, an increased circulation of blood, a burning sensation of the lungs, and, in many cases, decided symptoms of apoplexy and congestion of both the brain and lungs. It also produces insensibility to pain. Its reactive effects are, headache, vertigo,

loss of memory, numbness, inflammation of the brain and lungs, spitting of blood, insanity and death.

Fourthly. *Why* does it produce these effects, or what is the *modus operandi?* When sulphuric ether is taken into the lungs, the blood in passing through them for oxydation, instead of coming in contact with pure atmospheric air, with its quantum of oxygen, is met with a smothering malaria, which not only bestows upon it its poisoning influences but absolutely robs it of all of its oxygen, or life-giving principle, besides effecting other chemical and deleterious influences to which we shall hereafter refer. Its heating and pungent character produces irritating and smothering sensations, which, together with its anodyne and stimulating qualities, produce an almost instantaneous and very increased circulation of the blood. So that, in every instance of its administration, it *produces congestion of the brain and lungs in a greater or less degree!* And this is the secret of the manner of its producing insensibility to pain. The action of the blood upon the brain is legitimately the same, as when in apoplexy or any other instance of congestion of the brain. The stentorious breathing, the quickened circulation, the determination of blood to the head, the death-like stupor, and the dilated pupils, are all symptoms which cannot be mistaken, of violent congestion and compression of the brain. Congestion of the brain and lungs must ever be produced on the inhalation of ether in a greater or less degree, and will ever produce its corresponding injurious effects according to the ability of the system to overcome its influence. Death has repeatedly been produced by the inhalation of sulphuric ether, and on dissection, the brain and lungs have been found *gorged with blood!* What does this prove, but that the blood-vessels of these two all important organs have been overstrained, even to bursting—that congestion has taken place. It is not strange that when the sensorium itself is completely deadened by compression, that all of its dependencies should be unfeeling and inactive.

Before entering into an exposition of its chemical effect upon the animal economy, we will consider another objection of a mechanical character. It is well known that during the admin-

istration of ether, the cause and effect follow closely upon each other; that its influence is almost instantaneous. The action upon the system is a violent one; from a state of quiet, the system is *suddenly* forced into one of dangerous and unnatural agitation. The pulse is either suddenly doubled—even tripled, or the volume of blood is fearfully increased. The labor of the lungs is suddenly increased to an unusual amount, the blood-vessels are suddenly distended to an unparalleled degree so suddenly, as in many instances, to cause their rupture. The compression produced upon the brain is so immediate and violent as almost to amount to a *shock!* and, in addition to this, the *subsidence* of the effect is almost as immediate. It requires but little reflection to convince us that the delicate organs and powers of the body must suffer and be endangered by this violence. Take a delicate piece of machinery, and suddenly bring it up to its highest degree of velocity, and you either greatly impair or ruin it; when at its greatest velocity, suddenly arrest it, and the consequences are the same. When we consider the striking analogy that exists in the two instances, are we not constrained to wonder that this "harp of a thousand strings should keep in tune" *at all*, under such influences. The wonder is not that death is the occasional consequence of its use, but that it does not occur oftener still.

In every instance wherein the human system suffers violence, and nature's laws are broken, the penalties of that violence must either directly or indirectly follow; and it matters not whether the human mind takes cognizance of the violence at the time or not, still the physical system must, as a penalty, suffer in a greater or less degree. How far, we may be unable to determine, but we can with no propriety declare that we have countermined this grand fundamental law of physical life. The fact, that the human system suffers pain, and violence and death, independent of all perceptible intelligence, comes up to us with an incontrovertible argument against the proposition. Our friends, laboring under the delirium of a fever, groan with the agony of a tortured and diseased organization, the pulse is quickened, the face is contorted, and the perspiration pours from the brow; and

yet, when they are restored to intelligence, they have no recollection of pain; their emaciated frame and enfeebled condition, are all the evidences to them, of the storm that has passed over them. The subjects who inhale ether, often groan and writhe and act as though they were in the greatest agony, and yet, on being restored to consciousness, recollect nothing that has transpired. Unconsciousness can never be an invincible safeguard to the physical system under violence, it never has been so, and it never will. But let us consider this subject from another point of view.

"Dr. James H. Bickford has addressed to the London Morning Chronicle a solemn warning against the use of ether. He denies that the insensibility which it produces is no worse than that of drunkenness or asphyxia. There is a chemical alteration in the vital constituents of the blood; for not only is that deprived of its oxygen, and of the power of coagulation—like the black vitiated blood of malignant and putrid fever—but the corpuscules, whence fibrin are formed, are actually dissolved. Hence, the blood takes a long time to regain its life-supporting, flesh-forming character? wounds show everted edges and refuse to heal; and the patient often sinks into death. The use of ether also tends to produce tubercular consumption of the lungs; in thirty cases of death after the use of ether, in the Dublin Hospitals, the deaths could be traced to recent tubercles, believed to be the product of the ether."

Some have endeavored to obviate this deleterious chemical effect by having the patient breathe pure oxygen immediately after inhaling the ether, but as the objectionable result has *already* been produced, the oxygen can have but a comparative palliating influence.

A writer in the North British Review, after speaking of the danger of ether being used by those inclined to apoplexy, or those afflicted with pulmonary complaints or affections of the heart, of its injurious influence upon the brain, and of its causing convulsions, swoons and apoplectic attacks, says, "So far as we know, there is not one instance of fatal casualty which can be ascribed *directly* to the ether's use." This is somewhat

singular when we have had such fearfully multiplied accounts of them. It is true, in most instances, the ether is said to be the *indirect* cause; but when effect follows so closely after cause, and in a line *so* direct, it is hardly honest to charge it with a deviation. But, unfortunately, we have many others of the most decided and direct character, and if we did not, it would make no difference in the premises. Notwithstanding the success of ether in Europe, we can hardly take up a foreign paper that does not record the death of a victim to its use.

The impossibility of graduating anything like a just relation between the quantity of ether to be given, and the amount of pain to be overcome, except in extreme cases, must ever be an objection to its indiscriminate use, and especially under trivial circumstances. If there be any graduation that can be relied upon, it must be that the danger diminishes in proportion to the severity of the operation, or the pain to be overcome. Yet the condition of the patient, the character of the operation, and a large variety of other circumstances must be taken into consideration, which can only be met by unusual skill and intelligent experience.

There is no propriety in our being told that very objectionable symptoms and fatal results do not often occur, that they do occur and cannot be anticipated is sufficient to condémn any thing like the general practice. The caution being sold at the same time with the right has hardly proven a safeguard against its effects, the principles upon which it acts upon the system are immutable, and must ever be in a greater or less degree the same, and consequently always *dangerous*.

If the administration of ether is ever justifiable, it must be under the most extraordinary circumstances, when an important surgical operation is to be performed, involving life and death. Into what utter insignificance then does the pain of the mere extraction of a tooth shrink, compared with the consequences which may occur; and in view of all the facts, are we not constrained to question the morality of those who will resort to it indiscriminately for that purpose.

The ether excitement has evidently had its day, and is des-

tined soon to be superseded by that healthful reaction of common sense, which follows extremes in medical as well as other sciences. It will be laid aside as one of those powerful and dangerous agents, which we are justified in using only in the most extreme cases, that it may ultimately prove a blessing to mankind, we are not prepared to admit or deny; but that thus far it has produced a fearful amount of injury in comparison with the good, we have not the slightest doubt.

In regard to the array of distinguished names who advocate the drug, we have only to say: Truths as old as the establishment of medical science, common sense, and every exalted consideration, is against them; the better part of the profession is against them; and eventually, the whole scientific world must unite in condemning a course that is fraught with so much danger, and is liable to such fatal consequences.

In conclusion, then, we are constrained to record, that the use of sulphuric ether in the dental profession will be of small advantage, for the circumstances must rarely occur wherein its administratron would be justifiable.

That the administration of ether, or its effects, may ultimately be so modified as not to produce dangerous consequences, we with others most ardently hope, though we cannot see how it can be accomplished. Still, in any event, Dr. Morton is entitled to the respect and gratitude of the world at large, for his generous manifestations of an honest desire to promote the well being and alleviate the sufferings of mankind.

The above article was written previous to the reception of the communication from Dr. Morton, and at first sight we had thought of laying it aside, and penning another, more particularly applicable and appropriate as a *modifier* of Dr. M's. But on a "second sober thought" we have concluded, as Dr. Morton takes no particular issue with us, to publish it entire, adding merely a few subsequent reflections.

So far as regards the subject at issue—the propriety of using ether in the dental profession—we have no reason as yet to change materially our views as expressed in our article. We

have heard that Dr. M. has abandoned his apparatus and recommends in its stead merely the use of a sponge. We certainly approve of this as far as it goes, for considerations which we have already indirectly expressed, and we are not at this time prepared to deny, that it may not lessen its liability to produce injury.

Dr. Morton has certainly most clearly and fairly proven to our minds, that he alone is the original discoverer; and whatever honor the future experience of the world may prove due to her benefactor in this respect, must in all justice be accredited to him. We have no misgivings in this respect, and trust as ardently as the doctor could wish, that his most sanguine hopes in regard to his discovery may be fully realised, and that well earned laurels may be the grateful and spontaneous acknowledgment due from a benefitted world.

We understand that Dr. M. has subjected himself to large sacrifices of time and pecuniary means in his endeavor to bring before the world a discovery which he hoped would so largely contribute to the happiness of mankind, for his honest and generous *intentions* at least, whether he is eventually successful or not, he is entitled to the respect and gratitude of all. But what we more particularly admire in the man, is the noble position which he has more recently taken. He has evidently considered his responsibilities to the world at large, and more particularly his relation to a liberal association of which we are now proud to claim him as a member. I allude to that spirit which actuated him in common with the fearless Harvey and Jenner, Louis, Cooper, Physic and others—to lay his discovery on the altar of universal charity and benevolence.

We can easily see how Dr. Morton was led into the course that he took in regard to patenting his discovery; and from his statement we are bound to believe that the illiberal and unprofessional idea of taking such a step, never originated with him.

Time will show that the course Dr. Morton has pursued, or some other cause—or, perhaps, this in connection *with* others—has given an impulse in regard to this very principle which will end in purifying our society from every thing that

which will end in purifying our society from every thing that savors of quackery and illiberality in any form. The proceedings of our late annual meeting show to the world, that we are influenced by a spirit like this, and with no prophetic eye, we declare, that at every subsequent meeting, it will continue to influence us, until our Association shall be crowned with that true dignity designed by its original founders.

A liberal profession like ours, devoted to the amelioration of the condition of humanity, a profession which joins hand in hand with the noble one of medicine and surgery, in bestowing happiness and relief to our great brotherhood of the human race, so far *as* regards the *profession*, have no right to *secrets* and *patents ;* and should any of its members become obstinate in regard to their professed "rights," they at once rebel against the *spirit* of our *fraternity*, forfeit all claims to our countenance, and should be regarded accordingly.—*Cazenovia Ed.*

Review.

ARTICLE IX.

A Practical Treatise on the Operation of Surgical and Mechanical Dentistry. By SAMUEL C. HARBERT, Surgeon Dentist, Philadelphia. BURRIT & JONES, Printers—1847.

THE above is the title of a book—yes—a book of two hundred and six pages; with a most imposing index, and a preface of exceedingly modest dimension—a preface in which the author puts forth the astounding statement, (and by his book, he, of course, offers to prove the fact,) that "Several useful works have been published on the operations of dental surgery, while the mechanical department, *as yet in its infancy*, has received but little attention."

If, then, the works of Drs. Harris, Brown, Maury, Fox, Robinson, and of a host of others heretofore supposed eminent writers

on mechanical dentistry, have been only doing up the subject in its baby clothes—what note of praise is long, loud, deep, immense enough to do but common justice to our author, who, of course, presents the subject now full grown, and fully developed:

"Hail chieftain of the dental art,
To thee its votaries kneel,
Their eyes stick out like skillet-legs,
So thankful do they feel."

But more than this: Our author with that cool, quiet, self-complacency, which a long life of great and varied professional experience, together with a mind of supreme mental endowments can only give, fully conscious that he is treating of a subject "*as yet in its infancy*," one that he has "solitary and alone," reared up to its full meridian, says of its work, "It was designed in the publication of this volume, to fill an existing void in the mechanical part of dental practice, and at the same time to aid the practitioner in dental surgery, *by means of the author's experience and research.*" Mark that: the author's experience and research—how magnanimous, very—how unsophisticated his dignotion.

But this is not all—our author proceeds: "A life of practical experience, exercised with the growing operations of the art, and in the theatre of its most successful experiments, *form the basis of the writer's resources*, from which he has drawn liberally, and unreservedly, withholding nothing he considered important in the prosecution of the dental art," and this, dear reader, will appear, in the sequel, as clear as "mud."

We must not, however, at this place forget, for the benefit of those who may wish to procure instruments, teeth, and a few other things consonant with our author's "experience and research," to mention that these matters have been very thoughtfully provided for by the author, and illustrated in four extensive plates—which plates may be found most cunningly arranged, between the index and preface of the book, instead of being scattered throughout the pages of the work, for the pur-

pose of illustrating, more clearly, important matters in the text; a plan that has been so ignorantly adhered to by most writers who have preceded our author, and as there is no one thing that will exhibit the character of our author's "resources" so graphically as his cuts, we will now notice them in detail:

Plate 1, Fig. 1, represents five excavators, one burr-headed drill, and one common drill, and one socket handle as fitted to the whole lot, all copied if I mistake not, from the celebrated works of Dr. Paré, who flourished during the fifteenth century. Figs. 2, 3, 4, represent tooth-keys in the grammatical comparison of big, bigger, biggest; and copied without the slightest alterations, from a German work published before the time of Paré.

Plate 2, Figs. 1, 2, 4, 5, represent artificial teeth with gums "of brick-dust hue." Fig. 3, represents teeth mounted on plate, from which an important improvement of the author sticks out on one side, almost three-fourths of an inch. Fig. 6, is *not* a representation of the author and his book, but of a bellows, and a fixture, which no doubt would be as useful to the Humane Society for the Restoration of the Drowned, as it will be to the dental profession.

Plate 3, Fig. 1, represents a crooked pair of forceps without any observable peculiarity. Fig. 2, a plaster cast mounted with beeswax, &c.

Plate 4, Fig. 1, represents a punch of doubtful qualifications. Fig. 2, a spiral spring of a very familiar aspect; this constitutes the finale of our author's group of ancient and of homogeneous cuts.

"Oh! how edifying 'tis to see
The empty comb of a humble bee."

Part 1st. Chapter 1st. The history and importance of the dental art.

We dislike our author's use of the word *art*, its import is so equivocal, so like trade, it is so like hauling our standard down among the mere mechanical pursuits of life, instead of rearing it aloft side by side with the most useful sciences of the age,

and there maintaining it, not only by the correctness of our theory and practice, but by every *word, deed and action.* Our author commences: "The necessity of knowledge in the anatomical structure and organization of the teeth; and the treatment of diseases to which they are subject, are matters of more importance than would be supposed from the practice of *a majority of dental operators*, who content with the merest exhibition of mechanical ingenuity," &c. He affirms that such "operate in all cases alike,"—"to the serious inconvenience and comfort of the patient;" that they destroy many teeth "that might have been, by judicious treatment, preserved for life." He laments that the dental profession is in the hands of such "charlatans and imposters," and that "no penal enactment can reach them." This is all very sensible, and, doubtless, very true. But mark what follows: He says, "These remarks, are not designed to apply to *the mass of dental operators.*" And now, pray, what are we to understand by "the mass of dental operators," if it does not mean "the majority of dental operators." Our author, doubtless, knows—we do not—and so

"We'll pass along to spots more clear."

Our author proceeds, "a ray of hope has dawned upon the dental *art* in this country, by the establishment of collegiate institutions in the cities of Baltimore and *Philadelphia.*" Now, how on earth our author could have made such a mistake as to locate one of the dental colleges in Philadelphia, in the very city in which he resides, instead of Cincinnati, where it is well known that college has been in operation for the last two or three years, can only be imagined by supposing that he has drawn upon his own "resources" for this important historical fact.

Our author proceeds—he next complains that the "science of dentistry has made but a slothful progress compared with other arts," that Hippocrates, "in his writings, treated of the diseases and functions of the teeth," and likewise "Celsus, a Roman physician," and "many other physicians of antiquity;" and here

our author all at once fizzles, fizzles, fizzles out, without saying one word on "the importance of the dental art," as we had a right to expect from the heading of this chapter—

> "O, dear! O, dear! what can the matter be,
> O, blood and zounds! what can the matter be,
> And they all cried out, what can the matter be,
> He's bothered from head to the tail."

Thus far have we gone with our author, and thus far have we given a full outline of our author's remarks, sufficient we trust to convey a tolerable correct idea of his "resources" and literary abilities. We now propose to notice, and very briefly, a few passages from the body of his work, with the view of shadowing forth the author's "experience and research" in a professional point of view, and then close with a few general remarks.

Our author, like other writers who have preceded him, treats of his subject under different heads, and these different heads are very like those of other writers, almost as much so as the similarity of the matter, which in most chapters amounts to about the same thing, save now and then, when our author is less full and clear than his cotemporaries.

The following example, although a little more full and original than is common with our author, is very characteristic of him. In treating "of a proper regard to the health and permanency of the teeth," he uses the following language: "Abscesses of a serious nature are frequently produced in the gums by cold striking against the nerve of a decayed tooth. This state of things is not unfrequently characterised by severe general symptoms, such as pain, first centred in the gum, extending itself to the eye, nose and ears; head-ache, restlessness, *catarrh, cough, occasionally diarrhœa and dysentery; dejection and oppression of spirits;* fever, unusual irritability, furred tongue, *spasms, fits, and convulsions;* in females, high fever and delirium."

From this we are to infer that pain and inflammation in the gums—besides a host of other woes—cause males to have

spasms, fits and convulsions; in females, high fever and delirium. Thus our author, in the language of Moore,

"————Wraps nonsense round
In pomp and darkness, till it seems profound;
Play on the hopes, the terrors of mankind
With changeful skill. * * * * * * * *
While reason, like a grave-faced mummy, stands
O'erwhelmed with lies and misplaced words."

Our author has doubtless some ambition in the way of being quoted by the temperance orators of our day, which alone can explain the following isolated paragraph respecting a very intemperate woman. He says, "after making way with all her substance, and being without the means of procuring drink, she actually sold all her teeth but two to procure her favorite beverage—gin. The price she received was four pence each." A somewhat similar affair must have happened in the days of Robin Hood, which is duly announced and condemned by his historian in the following lines:

"To sell her bones was very bad,
But to buy them was much badder."

We now turn over several chapters to notice our author's opinion of the effects of tobacco upon the teeth. He says, "that it is injurious, may be inferred from two circumstances: first, the action upon the gums, and thence indirectly upon the vital functions of the tooth; and secondly, by absorption of its active properties into the bony substance of the tooth. * * * * * * The teeth not only externally, but upon an anatomical examination, will be found highly impregnated with a *yellow fluid*, evident only in the teeth of persons who use tobacco."

This same *yellow fluid*, which our author describes as being found in the teeth of tobacco-chewers, is likewise referred to by a Mrs. Caudle, of a body, in the following lines, which is the only authority we can find that goes in the least towards supporting the correctness of our author's discovery:

The quid goes in, when the pipe goes out,
'Tis chew, chew, chew;

Now a cloud of smoke pours from his throat,
Then his mouth sends a *yellow stream* afloat,
Sufficient to carry a mill or a boat—
'Tis chew, chew, chew."

A few chapters further on, our author discourses on the "treatment of caries," and of the best material for plugging teeth. He says of gold, "Large cavities are sometimes considered not worth filling with this metal. My own opinion is, *that a tooth worthy to be filled, is worth filling with gold.* When it is past the hope of remedy, it had better be extracted, than to prolong the inconveniences, and evils of it, by useless experiments. This doctrine, "that a tooth worthy to be filled, is worth filling with gold," is by no means peculiar to our author. It long since became a fixed principle of practice, with all well informed *sane* dental surgeons, and one to which they adhere with the most uncompromising fidelity. How is it with our author? A few pages further along, he treats on the "Filling of teeth." Hear him. "Cement, for teeth *presenting a mere shell*, or for roots that a patient may be anxious to retain, will be found highly useful, and not as objectionable as is generally imagined; it can be applied without the preparation that should be exercised previous to filling with other substances, and soon acquires a hardness that will resist any ordinary attrition. I have used it in large quantities, and have never found any bad effects from it; it is also used by many practitioners whose celebrity should entitle their judgment to some respect; by their practice, they must agree with me, in the utility and harmlessness of it."

Thus it will be perceived, that our author "halts not between two opinions." He goes for gold plugs, and for nothing else but gold plugs; and then, again, he goes for cement, and for cement as far as the most vehement "amalgamite" could desire. He goes for extracting all teeth "that are not worthy of being filled with gold," and then again he goes for filling with cement, "teeth presenting a mere shell." In short, our author appears to go for anything that may tend towards making up a book. This, the second part of his work goes to show even

more plainly than the first; and as we have already quoted from our author quite sufficiently, we trust, to convey a very general impression of his book, we will close our review here, deeply impressed with this conclusion, that our author is very much like unto a small necked bottle, "the less there is in it, the more noise it makes in pouring that little out."

The time has come, when, doubtless, much attention will be directed towards dental literature. Many books will be yearly thrust before the profession, some emanating from the pens of well-educated and well-informed dental surgeons, but many more from vain, impertinent and ignorant dental pretenders. And how are the profession at large to distinguish the works of the worthy from those of the unworthy? How are they to be warned of the imposter and his impositions? There is no way that we know of but one, no plan but to review all works of a dental character, so soon as they fall from the press, and to review them fully, fairly and fearlessly. This course will not only put down effectually and speedily, the frothy puff-books of the pretenders, but it will likewise have the tendency to advance the works of the true dental surgeon, and to bring them to the notice of the whole dental profession, and not only of the dental profession, but of the medical world; and here we would add, that it is the approbation and support of the medical profession that dentists should seek to secure, if they would rise in professional standing; and they can only hope to secure this approbation, by the correctness of their principles and practice.

S. P. HULLIHEN.

Bibliographical Notices.

A Treatise on the Cardinal Points of Dental Science and Practice. By S. M. SHEPHERD, Dental Surgeon, 24mo, pp. 20, Petersburg, Va. 1847.

The above little pamphlet is written in a plain and familiar style, and contains much valuable information. It is closely printed with small type, and is divided into eight chapters. The first treats upon the claims

of dental science upon public attention, the attention the mouth requires during infancy for the preservation of the temporary teeth. The second is devoted to the management of first dentition, the importance of the deciduous teeth, the deleterious effects resulting from their premature loss, the means necessary for their preservation; the first four permanent molares. The third treats of the means necessary for the prevention of dental caries, and the causes of this disease. In the fourth, the curative indications of dental caries are pointed out, the causes of the prejudice entertained by the public against dental operations, and shows that the failures of dental operations to fulfil the end for which they were performed, are not attributable to any inefficiency of the resources of the art.

The fifth chapter treats of the agency of caries in the destruction of the teeth, effects of mercury and salivary calculi upon these organs, the use of the file upon them, and the prejudices that exist against the use of this instrument upon the teeth. Chapter six treats of the importance of filling teeth, the materials most proper to be employed for this operation, the impropriety of performing it after the nerve has become exposed, tooth-ache, and extraction as constituting the only sure remedy for the disease. The seventh chapter treats of the extirpation of the nerves of teeth, the morbid effects of diseased teeth, and the importance of preserving the health of the mouth. Chapter eight is devoted to artificial teeth, bad effects resulting from them when improperly applied, and their utility when properly constructed and inserted.—*Balt. Ed.*

Advice on the Management of the Teeth. By T. B. Hamlin, D. D. S. Fellow of the American Society of Dental Surgeons, &c. 12mo, pp. 24, Nashville, Tenn. 1847.

The above is the title of another small popular treatise on the teeth, containing much useful and valuable advice. It is well written, and beautifully gotten up, several pages of it are devoted to the hygiene of the mouth, embodying much useful information upon the subject. The means for the preservation of the health of the dental apparatus are briefly but very clearly pointed out.

The most common of the diseases of the teeth and gums, and their remedial indications, are treated of in a familiar manner, as also artificial teeth, &c.

We have always been an advocate for the dissemination of correct information upon the hygiene of the dental organism, and we should be glad to have such information placed within the reach of every individual, believing as we do, that much good would result from it.—*Balt. Ed.*

Amblre's Dental Register for 1847.—We received some months since, from the author, Mr. J. G. Ambler, surgeon dentist of New York, a very neatly gotten-up register, so arranged, that the operations for every day in the year, may be recorded, with such remarks as the peculiarity of each individual case may suggest. Every practitioner should be provided with a case-book of this sort, and if he would accustom himself to note the peculiarities of every case, he would soon collect a large amount of valuable statistical information.

We should have acknowledged the receipt of the above work, and for which we now beg to tender our thanks, at a much earlier period, but for the fact, that soon after receiving it, we were compelled, on account of ill health to leave the city, and it was during our absence that the March number of the Journal was issued; and in preparing the matter for the June number, the Register having been placed in the Infirmary of the Baltimore College of Dental Surgery, for the purpose of recording the cases that were treated there, it entirely escaped our attention.—*Balt. Ed.*

The Case-Book, or Dentist's Day-Book, Leger, and Recorder, combined. Containing a system for Recording Operations on the Teeth, by which the surface and even the location of the surface may be recorded. Containing, also, an Alphabet and an Introduction, illustrating the Utility of the System and its Method of Use. By F. L. Crane, D. D. S. of Easton, Pa.

As will be seen by the above, Dr. Crane of Easton, Pa., has presented the profession with a case-book. It is beautifully gotten up, and most admirably arranged for the record of cases. It at the same time answers the purpose of a day-book and leger. By the adoption of a set of indicators, the necessity of writing out the operation in full is wholly avoided, and any one of these indicators may be made with a single touch of the pen. We like the arrangement of the book much, and take great pleasure in recommending it to the profession.

The publication of so many case-books argues well for the profession; it shows that its members feel the importance of collecting facts and making observations which may be applied to purposes of practical utility. We are glad that such a spirit of inquiry is abroad, as it must contribute to the advancement of the science and art of this most important branch of physical alleviation. It also shows that the ranks of the profession are beginning to be filled with scientific men—men who would elevate it to the dignity of the other branches of medicine.

The case-book of Dr. Crane contains about four hundred pages, and is bound in morocco. For the very beautiful copy which he has presented to us, we tender him our thanks.—*Balt. Ed.*

Remarks on the Proper Mode of Administering Sulphuric Ether by Inhalation. By William T. G. Morton; 12mo, pp. 44, Boston, 1847.

The above work, dedicated to the Surgeons of the Massachusetts General Hospital, is beautifully printed. It is designed to serve as a guide in the administration by inhalation of sulphuric ether for the relief of pain during surgical operations, and to such especially as are inexperienced in the use of this most subtle and powerful agent, it will be found highly valuable. The directions which it contains upon the subject are clearly expressed, and we doubt not, if they were always followed, its *liability* to produce dangerous effects would be very greatly lessened.

With regard to the efficiency of this agent, when inhaled, in the prevention of pain in surgical operations, there can be no question; this fact has been well established, and we believe too, it may be taken in a large majority of the cases with comparative impunity; but still, we believe it should only be administered for the prevention of pain in very severe and protracted surgical operations. As for ourself, though we extract a considerable number of teeth every day, we do not meet with half a dozen cases a year in which we have any difficulty in persuading our patients to submit to the operation; and thus far, we have succeeded in prevailing on nearly all of the subjects of even these, though not so easily, to submit to it. For so simple an operation as that of the extraction of a tooth, we do not think the inhalation of the vapor of ether should be resorted to, or, at any rate, except in some *very rare* cases. Certainly, we have not met with a case, since the discovery of the application of this agent for the prevention of pain, in which we should have felt ourself justifiable in using it.

The discovery, however, may prove valuable, and Dr. Morton is evidently entitled to the honor and credit of the principal authorship of it. The abandonment of the patent which he had secured for its use, is also creditable to him in the highest degree. But our own views with regard to the propriety of using this agent are so ably and fully expressed in another part of the present number of the Journal, by our colleague, Dr. Dwinelle, it is unnecessary for us to say more upon the subject at present. We ask for this article a careful and attentive perusal.—*Balt. Ed.*

Principles of Human Physiology, with their chief applications to Pathology, Hygiene and Forensic Medicine. By Wm. B. Carpenter, M. D., F. R. S., &c. &c. &c. Third American, from the last London edition, with notes and additions by Meredith Clymer, M. D. With 317 wood cuts and other illustrations. Philadelphia: Lea & Blanchard.

The character of Dr. Carpenter's Physiology is too well known to require any exhibition by us. It is a thorough work on this interesting and

important subject, and having passed through three editions in Great Britain and in this country, it may be considered as established in the public regard. To all who desire to make themselves acquainted with Human Physiology we recommend this work.

MANCHESTER MEDICAL SOCIETY

Miscellaneous Notices.

EIGHTH ANNUAL MEETING OF THE AMERICAN SOCIETY.

The eighth annual meeting of the American Society of Dental Surgeons convened pursuant to adjournment, at Saratoga Springs, Tuesday, August 3d, 1847.

The Society convened at the United States Hotel, at 9 A. M., and adjourned to the Union Hall, where rooms had been provided for holding its daily sessions. At 9½ o'clock the Society met at the latter place and was called to order by the President. Present, E. Parmly, C. A. Harris, A. Westcott, J. Parmly, Lewis Roper, E. Noyes, E. Laroque, Geo. Merriman, C. C. Allen, E. J. Dunning, Benj. Lord, J. H. Foster, J. B. Rich, C. S. Rowell, John Lovejoy, A. Van Camp, Alex. Nelson, H. N. Fenn, Asa Hill, Wm. H. Goddard, J. M. Peak, N. C. Keep, Seth P. Miller, Wm. H. Dwinelle, H. H. Young, E. Baker, D. R. Parmly, H. F. Smith.

The first business was to call upon the Recording Secretary for his report in regard to the duty assigned him relative to the subject of amalgams. This report is as follows, viz.

At the annual meeting of 1846, the American Society of Dental Surgeons made it my duty to issue a protest against the use of amalgams for dental purposes, in accordance with certain resolutions passed at said session, and to direct it to all who were reported as "delinquents" in regard to signing a similar protest ordered by the Society in 1845, and which was then directed to every member of the Society. The number reported as delinquents at the meeting of 1846, or on the original protest, was *fifty-six.* I am happy to be able to state that this list is now reduced to *twenty-one.*

The names of said delinquents are as follows—C. C. Allen, E. Baker, Geo. E. Haws, John Lovejoy, E. Laroque, D. Morrow, Geo. Merriman, C. S. Rowell, E. M. Bissel, S. Dillingham, J. Smith Dodge, Nehemiah Dodge, P. Houston, E. Jamet, Benj. Lord, Jas. Taylor, Geo. W. Parmly, Elijah Bryon, N. C. Keep, J. M. Peak and B. B. Brown.

Several of these have replied to the circular by letter, which communications I herewith transmit.

A. WESTCOTT, *Recording Secretary.*

On motion of Wm. H. Goddard, it was unanimously

Resolved, That this report, together with the replies elicited by the circular, be referred to a committee of five, and that this committee be requested to report some plan of disposing of this subject at this meeting, and also that said committee be requested to arrange the order of business.

This committee was appointed by the chair, and is as follows, viz.—Drs. C. A. Harris, A. Westcott, W. H. Goddard, J. H. Foster, and J. Parmly.

The committee, after consulting upon this subject, and finding that each member entertained similar views, declined acting till they had consulted with some of those who entertained views upon this subject differing from that expressed by those composing the committee. The committee therefore sent a request to the Society, that at least two more be added, and that they be selected from those who had dissented from the former action of the Society. Whereupon, C. C. Allen and Benj. Lord were added to the original committee. There being no business before the Society, it was resolved to adjourn till 3 o'clock, to give the committee time to deliberate and report upon the subject referred to them.

Three o'clock, P. M.

The Society having convened pursuant to adjournment, the committee to whom was referred the Recording Secretary's report presented the following resolutions:

Resolved, That your committee will not recommend the expulsion of any member who is not in the practice of *using or recommending* the use of amalgam for filling teeth.

Resolved further, That it is the duty of every member, who has the usefulness of this Society at heart, either to acquiesce in its doings so far as his *practice* and *influence* is concerned, or quietly to retire and resign his membership.

C. A. HARRIS,
J. H. FOSTER,
WM. H. GODDARD,
AMOS WESTCOTT,
J. PARMLY,
BENJ. LORD,
CHAS. C. ALLEN,
} *Committee.*

On motion of Dr. Merriman, the report was unanimously accepted.

On motion, it was laid on the table for half an hour, that its bearing might be more fully considered by each member; meanwhile the Society proceeded with other business.

On motion of Dr. C. A. Harris, the following resolutions, prepared by Dr. C. O. Cone, were unanimously adopted, viz.

For the purpose of more fully carrying out the design of this Association,

Resolved, That the American Society of Dental Surgeons shall, at its annual meetings, appoint a committee of five of its active members, who shall be known as a Committee of Practical Dentistry; the duty of which shall be to make an annual report to the Society of the improvements effected in this country in the management of disease coming within the scope of the dental practitioner, and the condition and progress of dental knowledge in America during the year of their service.

And be it further Resolved, That it shall be the duty of each member of this Association to communicate all information or novel results in practice, at their earliest possible convenience, to the above committee, that the above resolution may be more fully carried out.

The following members were appointed on that committee, viz. Drs. C. O. Cone, J. B. Rich, J. H. Foster, E. Maynard, A. Nelson.

On motion of Wm. H. Goddard, the following resolution was adopted:

Resolved, That any member in arrears to this Society shall be ineligible to fill any office, and shall be debarred the privilege of voting upon any question pending before the Society, until such arrearages are paid.

The report of the committee was again taken up, and on motion of A. Westcott, it was unanimously adopted.

The Society now proceeded to act upon the cases of individual members composing the list of delinquents.

The first name of this list being that of C. C. Allen, he was called upon to define his position in regard to the subject of amalgams, and also of the action of the Society thereupon. Dr. Allen responded in substance as follows: He stated that two years ago he signed a protest to the effect that he would neither use nor recommend amalgams for dental purposes, that since that time he had not used it, and that he was willing to adhere to the pledge he had already signed. He farther stated, that if it would be acceptable, he would produce that pledge and have it put on file with papers of the Society. He, however, still protested against the action of the Society, on the ground that it was unconstitutional.

Dr. Allen's case was deferred till his pledge was read before the Society.

The name of E. Baker was next called, but he being absent, action on his case was postponed till to-morrow, when it was expected he would be present.

The name of Geo. E. Hawes was next called. Dr. Hawes was not present, but Dr. C. C. Allen answered to his name, and stated that he was authorized to vouch for him. No action was therefore taken upon his case.

Dr. John Lovejoy was next called upon. Dr. Lovejoy responded in substance as follows: That he had used the amalgam, more or less, for filling teeth, and that he had found it beneficial in certain cases, and that he was unwilling to relinquish his "right of opinion;" that in *his* opinion the Society had no right to expel him, or any other member, on the ground

assumed by them, and that he should continue to use amalgam as heretofore.

After Dr. Lovejoy had concluded his remarks, A. Westcott offered the following resolution (A,) which was seconded by J. H. Foster, and carried by a two-third vote:

Resolved, That Dr. John Lovejoy be and he is hereby expelled from the American Society of Dental Surgeons, for refusing to comply with their positive mandates, in *using*, and in refusing to discontinue the use of amalgams for filling teeth.

Mr. Laroque was next called upon. His views were in substance like those given by Dr. Lovejoy; said he had used the "paste" and was unwilling to abandon it. He was accordingly expelled on the above resolution (A.)

On motion of J. B. Rich, Dr. Lord's case was put over till to-morrow, 10 A. M.

On motion of A. Nelson, seconded by E. J. Dunning, Geo. Merriman was unanimously expelled on resolution (A.)

Adjourned to 8 P. M.

Eight o'clock, P. M.

The President in the chair. The case of J. M. Peak was laid over till to-morrow, 10 A. M.

Dr. N. C. Keep was next called upon. He stated that he was desirous to retain his membership, but that he had occasional calls for amalgam fillings, when the patients *would* have it, and that he had sometimes used it where he thought it was for the benefit of the patient; said he would be glad to meet the Society on some conciliating ground, and that if they would give him time, he would prepare a protest such as he would be willing to sign. His case was therefore postponed.

D. Morrow was expelled on the following resolution (B,) by a two-third vote:

Resolved, That D. Morrow be and he is hereby expelled from the American Society of Dental Surgeons, for refusing to comply with their positive mandates, by refusing to sign the protest of this body relative to the use of amalgams for filling teeth.

Case of C. S. Rowell laid over to 10 o'clock to-morrow.

G. W. Parmly's case laid over for one year, he being out of the country.

E. Bryan expelled on resolution (A.)

C. A. Harris moved that the cases of those remaining be laid over till next annual meeting. Lost.

Dr. J. H. Foster moved that the cases of E. M. Bissel, P. Houston and James Taylor be laid over one year. Carried.

On motion of A. Hill, it was

Resolved, That S. Dillingham, Nehemiah Dodge and E. Jamet be expelled on resolution (B.) Carried by a two-third vote.

Adjourned to meet at 9 A. M. to-morrow.

Wednesday, 9 o'clock, A. M.

Met pursuant to adjournment. After the President called the meeting to order, the minutes of the meeting up to the present time were read, accepted and approved.

Dr. C. O. Cone (through Dr. C. A. Harris,) offered the following resolution:

Resolved, That the Treasurer of the American Society of Dental Surgeons be instructed to forward immediately to all that are indebted to the Society, either for subscription to the American Journal and Library of Dental Science or for annual dues to the Society, their accounts; and if not paid, to enforce payment for the Journal by legal or such other means as he shall deem proper, to secure an early liquidation of their indebtedness for the same.

Resolved, That the Treasurer be instructed to forward to each subscriber of the American Journal and Library of Dental Science his subscription, on the issue of the *first number* for the volume forthcoming; and at the same time forward to each member of this Association, whose annual dues remain unpaid, a bill of dues for the current year.

C. C. Allen offered the following preamble and resolutions, which were unanimously adopted:

Whereas, one of the objects of this Society is to diffuse a knowledge of correct practice in surgical and mechanical dentistry *among all practising dentists,* and to give to all its members the benefits of all improvements in the science, thereby elevating it to the rank of a liberal profession; therefore,

Resolved, That it is derogatory to the dignity of this Society to retain as members any person who has secured, or shall hereafter secure, to himself by "letters patent," any invention or improvement in surgical or mechanical dentistry.

Resolved, That no man shall be considered an honorable member of this Society, who has secrets in his profession, or refuses to impart any knowledge or information which he may possess on the subject of surgical or mechanical dentistry, *or any of its collateral branches,* to any other member.

Dr. Baker presented the papers in his hands as chairman of the executive committee.

Several members being now present who were absent yesterday, the Secretary was called upon to recapitulate the preceding action of the Society and the next business in order. This being done, it was declared that action on Dr. Baker's case, which had been laid over that he might be present, was the next business in order.

On Dr. Baker's case being called, the Secretary, A. Westcott, resigned *pro tem.* his seat to E. J. Dunning. The President, E. Parmly, also resigned his chair *pro tem.* to Vice-president Dr. Enoch Noyes.

Dr. C. C. Allen moved that the case of Dr. Baker be indefinitely postponed, seconded by N. C. Keep. Lost.

Dr. Goddard moved that the case of Dr. Baker be *now* called up and acted upon, seconded by J. B. Rich. Carried.

Whereupon the President *pro tem.* requested Dr. Baker to state his views in relation to mineral paste.

He responded to the effect, that the action of the Society in relation to this subject had been entirely unconstitutional. He then expressed his dissatisfaction with the Society for having expelled members, while those were absent who took an interest in the proceedings, and who would have been glad to defend the accused. He then took up the general subject of the use of amalgam, and spoke in its defence.

After Dr. Baker had concluded his remarks, it was moved and seconded that Dr. Baker be expelled on resolution (A.)

Before the vote was taken, Dr. Baker arose and objected to the resolution, on the ground that it implied, or might imply, that he used nothing but mineral paste for plugging teeth.

Dr. Baker was replied to on the part of the Society, in effect, that as he (Dr. B.) had frequently acknowledged that he did use this article in his practice, and as he still declared his intention to use it, the Society would equally accomplish their object should they omit, in the *resolution*, to make the charge against which he protested; and that if it was more in accordance with his taste to be expelled under resolution (B,) the Society would not object to gratify him in this particular. It was therefore moved and seconded, that Dr. Baker be expelled on resolution (B.)

Dr. Baker called for the ayes and nays, which being taken, stood, ayes 16, nays 3. Dr. Baker was therefore declared to be *constitutionally* expelled under resolution (B.)

On motion, adjourned to meet at 3 o'clock, P. M.

Wednesday, 3 o'clock, P. M.

The Society met pursuant to adjournment, the President in the chair.

Dr. C. S. Rowell's name was called, but it was found that he had returned home. His case was disposed of by his being vouched for by Dr. E. Parmly and C. C. Allen.

Dr. N. C. Keep informed the Society that be had prepared a protest which he would be willing to sign, and hoped they would find it satisfactory. The protest referred to reads as follows, viz.

"Whereas, a majority of the members of the American Society of Dental Surgeons feel satisfied that injury is, and has been done to the public, by the use of amalgams for filling teeth, out of deference to their views, and being satisfied myself that it is not free from objection, I wish it understood, that I do not recommend or use amalgam as a substitute for gold. (Signed) N. C. KEEP."

After some discussion in regard to the import of this protest, and after

Dr. Keep gave his own exposition of it, in order to get the sense of the meeting upon it, it was moved, that Dr. Keep's protest be deemed satisfactory. *Unanimously* lost.

Dr. Lord offered his pledge, which was unanimously accepted.

J. M. Peak's case was next called up, but it appearing from the treasurer's books, that Dr. Peak had not paid any dues for four years, his case was dropped on the ground that he was not a member.

On motion, it was resolved, that Dr. C. Starr Brewster's case be acted upon, whereupon, Dr. J. H. Foster offered the following resolution, viz.

Resolved, That in view of good and sufficient evidence, to the effect that Dr. C. Starr Brewster has been in the habit of using amalgam for filling teeth, and that it was his intention to continue said practice,

Therefore, Resolved, That he be no longer considered an honorary member of the American Society of Dental Surgeons.

J. Smith Dodge's case was then taken up, and J. B. Rich, the chairman of the committee formerly appointed to investigate certain charges, reported; that he had summoned Dr. Dodge, and that he had not paid any attention to it: whereupon, he was expelled for *contumacy.*

Dr. C. C. Allen moved that Dr. Solyman Brown's resignation be accepted, on the ground that he had gone out of the profession. This motion was seconded by A. Westcott, and unanimously carried.

On motion of A. Westcott, Dr. Brown's dues were remitted.

On motion of E. Parmly, seconded by A. Westcott, a vote of thanks was tendered to Dr. Brown for his former labors in the society.

The committee on "Tabular Sheet," presented a report, which was accepted, but it not being finished, was referred back to the committee for completion, and publication.

Adjourned to 8 P. M.

Eight o'clock, P. M.

The first business of the Society was to elect officers for the ensuing year. The result was as follows:

E. PARMLY, New York,	PRESIDENT.
LEWIS ROPER, Philadelphia,	1st VICE-PRESIDENT.
E. NOYES, Baltimore,	2d " "
WM. H. GODDARD, Louisville,	3d " "
J. B. RICH, New York,	COR. SECRETARY.
A. WESTCOTT, Syracuse, N. Y.	REC. "
J. H. FOSTER, New York,	LIBRARIAN.
C. A. HARRIS, Baltimore,	1st EDITOR.
A. WESTCOTT, Syracuse, N. Y.	2d "
WM. H. DWINELLE, Cazenovia, N. Y.	3d "

Executive and Examining Committee.—Drs. J. H. Foster, J. B. Rich, E. J. Dunning, E. Parmly, J. M'Ilhany, C. A. Harris, H. N. Fenn.

Publishing Committee.—Editors.

Opening Address.—E. Maynard.

Dissertations.—1st. J. B. Rich. 2d. H. H. Young. 3d. Asa Hill. 4th. C. C. Allen. 5th. Dr. Miller.

Dr. N. C. Keep tendered his resignation, which was accepted.

The following resolution was offered by J. B. Rich,

Resolved, That persons delivering addresses or essays before this Society, be requested to furnish copies of the same, to be placed in the archives of this Society. And it is further

Resolved, That the editors of the official Journal of this Society have free access to such addresses and essays as may be deposited in the archives, for the purpose of making such selections for publication as they may see fit.

Dr. B. B. Brown's case was next called up. After due consideration it was, on motion of J. B. Rich,

Resolved, That he be expelled on resolution B.

Adjourned till 9 to-morrow.

Thursday, 9 o'clock, A. M.

On motion of Wm. H. Goddard,

Resolved, That each member of this Society be furnished with a list of its officers and members, printed upon a card suitable for framing, and signed, officially, by the President and Recording Secretary, and the seal of society affixed, and that it be published in five different papers, at the discretion of the editors, at the expense of the society.

On motion of A. Westcott, Dr. C. C. Allen was called upon to read the pledge which he had hitherto signed, and which he had requested the society to accept.

Dr. Allen accordingly read it before the Society, but it was decided that it did not embrace the ground covered by the pledge signed by other members, and, further, it did not carry out the spirit of the resolutions unanimously passed by the committee to whom the list of delinquents was referred, and of which committee Dr. Allen was a member. He was therefore requested to draft one in accordance with said resolution, and time was given him to do so.

On motion of Dr. C. C. Allen,

Resolved, That the Treasurer be authorised, at the expense of the Society, to take legal counsel in regard to the power of the society to collect annual dues.

The Executive and Examining Committee reported the following named gentlemen as applicants for membership, as being, in their estimation, eligible to the honor, viz. Wm. Dalrymple, C. H. Bestor, Wilks Allen, and Thomas Palmer.

All of the above were unanimously elected. Wm. Dalrymple and Thomas Palmer signed (by proxy) the constitution, and they were, therefore, admitted to full membership.

On motion of Dr. C. C. Allen, it was

Resolved, That when the Society adjourn, it adjourn to meet on the first Tuesday of August, 1848, at Niagara Falls.

Dr. C. C. Allen now presented a substitute for the pledge he had offered to the Society. On motion of Dr. Wm. H. Goddard, it was *accepted.*

The committee on Dr. John Allen's case, presented the following preamble and resolutions, viz.

Your committee appointed to take into consideration the case of Dr. John Allen of Cincinnati, relating to the course pursued by him towards this Society in respect to an invention which he has had patented, for remedying deformities of the face, report:

That, whereas, after having freely offered the benefits of his invention to every member of the Society, to be used gratuitously; that without their knowledge he had secured a patent therefor; and that, whereas, he he saw fit, at a subsequent period, to make an attempt to exact from members who might be disposed to use it, a certain per centage for the privilege of using it, your committee deem his conduct highly reprehensible.

And, whereas, Dr. Allen has made such use of the fact of a gold medal having been presented to him by this society, as the society do not contemplate in making such awards, and cannot approve or sanction,

Therefore, Resolved, That the censure of the Society be passed upon Dr. Allen, for having acted in a manner derogatory to his character as a professional gentleman, and attended with consequences highly detrimental to the Society of which he is a member.

JNO. B. RICH,
J. H. FOSTER,
J. PARMLY.

The report was accepted, and the committee discharged. On motion of J. B. Rich, the report was unanimously adopted.

On motion of Dr. Dunning,

Resolved, That the Corresponding Secretary address communications to the honorary members of this Society, requesting them to inform the Society definitely, what are their views respecting the employment of amalgam for stopping teeth, and if now using it, their intentions with regard to its future use in their practice.

Adjourned to meet at 4 P. M.

Thursday, 4 P. M.

Dr. N. C. Keep presented his resignation. Accepted.

An essay was read by Wm. H. Elliott, and, by unanimous vote, it was requested for the archives of the Society.

On motion of Dr. Harris, the vote to meet at Niagara Falls was reconsidered, and finally rescinded. On motion,

Resolved, To hold their next meeting at *Saratoga Springs*

On motion, it was

Resolved, That the aphorisms be placed in the hands of the *Editors*.

On motion of Dr. C. A. Harris, the Executive Committee were requested to make *the first day's business* of the Society at next annual meeting, *the discussion of the subject of plugging teeth.*

On motion of Dr. Westcott, a vote of thanks was tendered to the proprietors of the Union Hall, for their attention and kindness to the Society while in session.

Adjourned to meet at Saratoga Springs, on the first Tuesday in August, 1848.

Third Dentition.—About four years since, a lady aged about twenty-five years, wife of a medical gentleman of Baltimore, applied to us for an entire upper set of artificial teeth. The roots of the natural organs were still in the jaw. These we extracted, and at the expiration of nine months, the alveolar border having by this time undergone the changes which usually follow the loss of the teeth, we constructed and applied a dental substitute, which she still wears; but about two months since she again called on us, and playfully remarked, that she believed her jaw was about to be supplied with new teeth. On removing the artificial piece, we discovered, to our surprise, the crown of a right cuspidatus just peeping through the gum. Upon examination it was found to be well developed, and very firmly attached to the jaw bone, but it has neither root nor socket.

Such anomalous productions have occasionally been met with before, but no attempt, that we are aware of, has ever been made to explain the manner of their formation. Do they originate from a tissue different from that which gives rise to the rudiments of the teeth of first and second dentition? Although this is a question which physiology has never attempted to solve, we think no one will affirm they do, inexplicable, apparently, as may otherwise seem the manner of their formation.

The rudiments of the teeth of first and second dentition, as is now universally admitted, are the product of mucous membrane, while those of third dentition, or the anomalous productions of which we are now speaking, would *seem* to originate from the periosteal tissue, if not from the bone itself.

In obedience to what law of developmental anatomy are they formed? Certainly to none primitively impressed upon the animal economy, for they have never been known to appear so long as the secondary teeth remain in the jaws. If the establishment of a law which governs the development of a part, depends upon a certain condition of other contiguous parts, it is possible, we may be able to explain the phenomena. But the admission of this assumption, would overthrow the theory which some

have so ably and ingeniously maintained, that the rudiments of all the organs of the body exist at the very earliest period of intra-uterine existence, though perhaps not more fully than do the anomalous formations in question. It is very evident that certain parts, in certain states or conditions, and in particular locations, perform functions peculiar to the latter. In other words, the condition and location of a part, determines the function or functions which it performs.

For example, when the mucous membrane along the course of the alveolar border, begins to assume a duplicated or grooved appearance, which it does at about the sixth week of intra-uterine existence, dental papillæ shoot up from it, and when, by a similar duplication of this same tissue, behind the sacs of the temporary teeth, forming what Mr. Goodsir styles "cavities of reserve," the papillæ of the permanent teeth, one from the bottom or distal extremity of each duplication, begin to be developed. Hence, it would seem, that this particular state or condition of this tissue, and in these particular locations was necessary to determine the development of teeth germs. This arrangement or condition of mucous membrane, in these particular locations, which always results from the development of the fœtus, may be sometimes produced by accidental causes, after all the organs of the body have attained their full size, or at any time during life; and, when it does occur, it is not unreasonable to suppose that a new tooth papillæ should be formed. Proceeding still farther, the development of a dental papillæ, is the signal for the production of a dental follicle, which ultimately becomes a sac, and then an organ to supply the tooth, now considerably advanced in the process of formation, with a covering of enamel. But as the maxillary bone has previously attained its full size, it rarely, if ever happens, that an alveolus is formed for these accidental productions, and consequently they seldom have roots, or if they do, they are very short and blunt. They are usually connected to the periosteum of the alveolar border, and this union is sometimes so close and intimate, that a very considerable force is necessary for their removal, or, at least, so far as our own observations go upon the subject, and we have had occasion to extract several in the course of our practice. As a general rule, however, they loosen in the course of a few years and drop out.

But it may be asked, how are such accidental duplications of the mucous membrane formed? This is a question, we admit, which it may not be easy to answer, satisfactorily, but we do not think it at all improbable, that they occur during the curative process that follows the removal of one or more teeth. The granulated walls of the gums surrounding an alveolus from which a tooth has been extracted, may become covered with this tissue before the socket is filled with a deposit of new bone, so as to prevent a complete union after they have come together, or, at any rate, of the surfaces of the duplicated membrane near the bone, and when-

ever such arrangement or condition of this tissue does take place, upon the alveolar border, and that it may occasionally, we think there can be no question, it is probable that a new tooth papillæ is produced, which, in the progress of its development, induces the formation of the various appendages necessary to the production of a perfect tooth.

This, in our opinion, is the only way that these fortuitous productions can be accounted for in accordance with true physiological principles. It is impossible to explain the manner of their formation in any other way. All must admit that the presence of mucous membrane is necessary to originate them, and we cannot conceive of any other way by which its presence beneath the general surface of the gums can be accounted for; but if we admit this explanation to be correct, the question is at once solved. We believe it is also owing to the accidental occurrence of a certain arrangement or condition of the mucous membrane concerned in the production of the permanent teeth, consisting most likely, of the formation of one or more "cavities of reserve," than is called for by the teeth of this dentition, that the development of supernumerary teeth are attributable.

In maintaining that the development of a tooth germ results from a certain state or condition of the mucous membrane investing the crest of the alveolar border, we are aware that we may be met with the inquiry, what determines this particular arrangement of this tissue, and the number of the teeth of first and second dentition? We reply, that although we believe this question susceptible of satisfactory solution, we do not think it has any thing to do with the accidental production of these organs, if the fact be admitted, that the papillary rudiments of the teeth originate from mucous tissue.

The operations of nature, it is true, are so secretly carried on, that we cannot see the precise *modus operandi* by which they are effected, yet in the development of the various organs and structures of the body, we may see them in the various stages of their growth, as well as what precedes their arrival to these various stages in the progress of their formation, and upon which their accretion would seem to be dependent. The periods for the arrival of these stages of development, though somewhat irregular, occur for the most part, in normal conditions of the body, at certain fixed epochs. Thus the papilla of the first temporary molar may usually be seen between the sixth and seventh weeks of intra-uterine existence, but previously to this time a slight groove or depression is observable in the mucous membrane of the part from whence it has its origin. The same is true with regard to the papillæ of all the other teeth, though the time for the commencement of their formation occurs at later periods. The peculiar change which takes place in the arrangement of the mucous tissue here, as well as the periods at which they occur, is doubtless determined by certain stages in the development of other parts, and these very likely may determine the established number which the teeth of both dentitions have.

If the foregoing views which we have advanced be correct, these fortuitous productions are not the result of a mere freak of nature, as they are sometimes facetiously styled. They are the result of the operation of an established law of the economy; and although, after the completion of the teeth of second dentition, its course is suspended, the occurrence of a similar arrangement or condition of the mucous tissue in the parts in question, will again put it in operation.

But time will not permit us, at present, to speculate at greater length upon this most curious and interesting subject. Should we have leisure to do so, we may resume the discussion of it at some future period, when we shall endeavor to present our thoughts upon the subject in a more clear and systematic manner. In the meantime, we should be glad to have an opportunity of laying before our readers the views of others upon the subject.—*Balt. Ed.*

Importance of Medico-dental Education.—We published in the fourth number of the last volume of the Journal an ably written article from our London correspondent, Dr. J. Robinson, on the importance and value of a knowledge of the collateral branches of medicine and surgery in connection with dentistry, and another article upon the same subject from the same writer will be found in the present number. The value of such knowledge to the dental surgeon is most conclusively shown, as all must admit after perusing these ably written papers. The subject will be continued in the next number, and we bespeak for the series an attentive reading.—*Balt. Ed.*

The Work of Desirabode.—We shall complete the publication of the translation of this elaborate French treatise upon the science and art of dental surgery, in the Library part of our next number. The translation of this work has prevented the publication of several numbers of the Journal at the periods when they should have been issued. The translation being now nearly completed, we shall be able, for the future, to get the numbers out in better time.—*Balt. Ed.*

Mr. Tomes' Lectures.—We commenced the publication of a course of lectures delivered by Mr. Tomes, an eminent English dentist, before the Middlesex Hospital, upon the anatomy, physiology and pathology of the teeth. We have resumed their publication in the present number, and shall continue them in our next. These lectures are ably written, and will be read, we doubt not, with interest by the subscribers of the Journal. They contain a vast amount of valuable information upon the subjects upon which they treat.—*Balt. Ed.*

Transposition of the Teeth.—A young lady aged about eighteen, called upon us a few weeks since for the purpose of obtaining our professional services, and upon examining her teeth, we perceived that the right superior cuspidatus was situated between the central and lateral incisores of the same side, while the lateral was situated between it and the first bicuspis. The cuspidatus was well developed, and presented all the distinguishing characteristics which belong peculiarly to this class of teeth. The lateral incisor was of a medium size. In all other respects, the teeth were well arranged.

We have met with several similar examples of the transposition of teeth, and they have been noticed and described by several writers upon odontology. Miel presented two such examples to the Medical Society of Emulation. Delabarre has presented an engraving of one similar to the above. But how are such aberrations in the arrangement of the teeth caused? The generally received opinion upon the subject is, that they are the result of a transposition in the arrangement of the germs or pulps of these organs, and this would seem to be the only way by which such transposition could occur. But is it not possible, taking the case here described as an example, that the carneous body formed by the contraction of the sac of the permanent lateral incisor may have been developed on the side next the root of the temporary cuspidatus, and after having destroyed the intervening alveolar plate, that it then effected the destruction of the root of this tooth, instead of that of the temporary lateral incisor, and if so, is it not probable that it replaced the former, while the latter remained, as yet, undisturbed? Pursuing the supposition still further, might not the position of the cuspidatus have been so changed by the presence of the permanent lateral incisor, which had replaced the temporary cuspidatus, that the carneous body afterwards formed by the contraction of its sac, was made to act upon the root of the temporary lateral? and if so, is it not reasonable to presume, that the cuspidatus replaced the loss of the last named tooth?

That the transposition of permanent teeth is thus caused, we are not prepared to maintain. We throw out the suggestion merely for the purpose of eliciting inquiry upon the subject, and, in this connection, we would ask, if it was the result of a transposition of the germs of the teeth, would not the same aberration be as likely to occur in the arrangement of the temporary as in the permanent teeth?—*Balt. Ed.*

Contributions to the Museum of the Baltimore College of Dental Surgery.—A number of very interesting contributions have been made to the museum of the above named institution, within the last few months. Among the number are, a full set of artificial teeth, constructed by the

late Mr. Gardette of Philadelphia, about thirty-six years ago. The design and execution of this specimen of dental mechanism, is equal to any we have ever seen, constructed at the period when this was executed; also a denture for the lower jaw, fabricated by the late Dr. Hudson of the same city, about twenty-five years ago, and a double set of porcelain teeth, with artificial gums, mounted on platina plates. This last was constructed in Paris about sixteen years ago. These, together with a number of other specimens, were presented to the college by Dr. E. Townsand of Philadelphia.

In addition to the above, Mr. I. Wooffendale, surgeon dentist of New York, and son of the late Mr. R. Wooffendale, author of a treatise upon the teeth, published in London, in 1783, presented to us for the museum of this institution, a double set of teeth, constructed by his father upwards of sixty years ago. There is also an upper porcelain denture, with artificial gums, presented by Dr. E. Parmly of New York, and manufactured by N. De Chemant, in London, in 1795.

Besides the above named, and numerous other specimens of early dental mechanism, a large number of specimens of morbid dental anatomy, have recently been presented to the college; and among which, are three molar teeth united by exostosis. These were presented to us for the college by Dr. G. E. Hawes of New York. We received about the same time a number of specimens of diseased teeth, beautifully arranged, from Dr. N. Dodge, of the same city, and within the last day or two, from Dr. S. H. Williams, a central incisor of second dentition, with its root reflected up upon the anterior or labial surface of its crown.

Similar accessions are constantly being made to the museum of this institution, and we would take this opportunity to say, that any specimens, either healthy or morbid, of dental anatomy, or of dental mechanism, which members of the profession may feel disposed to contribute, will be thankfully received, and carefully arranged, with the names of the donors attached to them.—*Balt. Ed.*

Tardiness in the Shedding of the Temporary Teeth.—It is well known that one or more of the temporary teeth sometimes remain firmly articulated for years, after the time when they are usually removed by the operations of the economy, to give place to their more hardy successors. We have frequently met with individuals, thirty, forty, and even fifty years of age, with two or three of the temporary teeth still remaining in the jaws; but one of the most singular examples of this sort which we recollect to have ever met with, come to our notice a few days since; the subject of which is a lady between twenty-five and thirty years of age. All her temporary teeth were shed and replaced, as she informed us, at about the proper periods, except the left superior lateral incisor and cuspidatus.

These are still securely articulated, and in a perfectly healthy condition, while all of her permanent teeth are more or less affected by caries. The crowns of many are nearly destroyed. There is no indication of the appearance of the permanent lateral incisor, but the point of the crown of the cuspidatus of replacement has pierced the gum above the left central incisor, and the tooth, as is indicated by a ridge on the anterior part of the alveolar border, occupies a horizontal position in the jaw.—*Balt. Ed.*

To Subscribers in England.—The fourth number of the last volume of the Journal, which should have been in Liverpool by the 1st of July, was regularly boxed and sent to an express office to be taken to Boston, and sent out by one of the British steamers, but owing to some carelessness on the part of one of the agents, it was detained for several weeks in Philadelphia, and finally shipped on board of a packet ship, which sailed in August last. We shall endeavor, for the future, to prevent any accident of this kind.—*Balt. Ed.*

Omission.—We are compelled, for want of room, to omit several articles and notices which we had designed publishing in the present number. They shall appear in our next.—*Balt. Ed.*

Obituary.—Died in Valparaiso de Chili, on the 14th of July last, of inflammation of the liver, Dr. Mordaunt Stewart Robinson, youngest son of N. N. Robinson, Esq. of Baltimore. He was a graduate of the Baltimore College of Dental Surgery, and at his examination received the highest testimonials which it was in the power of his preceptor to award him. He left Baltimore on 2nd of June, 1845, for Valparaiso, to practice his profession in connection with his brother Dr. B. R. Robinson, who had taken up his residence there.

He was destined to be one of the brightest ornaments to his profession, for, combined with his courteous and gentlemanly bearing, he was in every respect qualified to administer to those who should require his services in each and every branch of his business.

The writer of this imperfect sketch enjoyed a long and uninterrupted intimacy with him, and sincerely sympathizes with his family and friends in their sore affliction, but they have abundant consolation in knowing that their loss is his gain, for he was not unmindful of his spiritual welfare, but expressed himself to be perfectly resigned to his fate and subservient to the will of his God. "Blessed are the dead who die in the Lord."

R. W. T.—D. D. S.

MANCHESTER MEDICAL SOCIETY

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ARTICLE I.

Observations upon the Importance and Value of a Knowledge of the Collateral Branches of Medicine and Surgery in connection with Dentistry. By JAMES ROBINSON, D. D. S., London.

[Continued from p. 33.]

HAVING in former papers disposed of materia medica, therapeutics and botany, we are naturally led to another branch of knowledge essential to a medico-dental education, and without which, our acquaintance with these would be comparatively useless—we allude to pharmacy or the art of preparing, preserving, combining and compounding the different substances employed in the practice of physic.

A knowledge of this subject is of greater importance as the substances of which it treats not only vary considerably in their characters, effects and modes of combination, but are derived alike from the animal, vegetable and mineral kingdoms. This knowledge, however, must not be supposed to consist merely in an acquaintance with the pharmacopiæ, (however perfect that acquaintance may be,) which simply teaches the mode of preparing from fixed formula, certain medicines, which the apothecary and chemist are supposed to keep ready for use,

but in a perfect acquaintance with the nature of the different medicines and all the various modes in which they may advantageously be employed, either alone or in combination with each other, for as it is rarely the case that a medicine finds its way either into the materia medica or pharmacopiæ, till its value has been stamped by its long and successful exhibition, a medical man, whether a general practitioner or dentist, must be content to follow in the beaten track, and dwell in (medical) decencies forever, unless he be prepared to think, reason and act for himself, and this he can only do by a perfect knowledge of the means at his command, and of the best and most judicious way of employing them. He may be perfectly acquainted with the mysteries of ℞ of rhubarb, have mastered the pons assinorum of Griffith's mixture, may be able to talk learnedly of decomposition, double decomposition and precipitation, and yet be as ignorant of the principles of pharmacy as an elephant of the polka. Young gentlemen *go through* the pharmacopiæ with a *grinder*, are parrotted in the different compositions and formulæ, learn to run over the chemical changes as glibly, as an Eaton boy his hic-hac-hoc, and yet after all, know nothing whatever of the subject.

To really understand pharmacy, a knowledge of botany, zoology and mineralogy is essential, while to determine the qualities and modes of action of the different pharmaceuticals, and understand the laws by which their combinations with, and actions on each other are governed, we must call in the aid of chemistry.

The mineral kingdom contributes largely to medicine—simples, as they are called, are in a great measure banished from practice as being less certain and determinate in their action and more likely to suffer deterioration from time, and a variety of extraneous circumstances, and chemical and concentrated remedies are the fashion of the day. Thus we have the various preparations of iron, quicksilver, antimony and iodine, &c. The preparations of morphia, narcotine, veratrine and strychnine. We have the principle of the black-cherry, water of the bitter almond concentrated in hydroscyanic acid, and the active properties of

the nauseous cinchona into the elegant and more definite quinine for all these—for the chlorates of lime and potass, the hydrodate of potass, and other active and valuable remedial agents, we are indebted to chemical research, and scientific experimental practice.

It must, however, be kept in mind, that while chemical and concentrated medicines are, if scientifically employed, more definite and certain in their operation than those of a more simple nature, they are at the same time more dangerous to handle and more liable to have their actions interfered and contravened by ignorant and unscientific management.

Thus, then, while pharmacy technically speaking may be considered to mean the art of compounding medicines, it has really a much higher mission, forming at least *one* of the most important branches of medical education, and so dependent on, and mixed up with the others, that whatever department of medicine a practitioner may devote himself to, an intimate acquaintance with its principles and practice is essential to his success, for although a knowledge of botany, materia medica and therapeutics, forms the base on which he will have to act, such knowledge would be comparatively useless, unless he were acquainted with the different modes in which the various remedial agents may be combined with, and act upon each other. He may practice, it is true, but his practice will be unscientific, unsatisfactory and unsafe.

We will suppose, that in a case (which, though taken from general practice, will exemplify our position) requiring a certain description and amount of tonic, a practitioner ignorant of pharmaceutical chemistry prescribes the protoxyde of iron, in conjunction with a carbonate of soda or potass, what would be the result? With the first alkali, decomposition would take place, and produce a tonic, certainly, (the carbonate of iron,) but one of so inert and questionable a nature as to lie under the suspicion of being useless, while with the latter alkali potass he would have a ferrocuret of potassium, a deleterious if not fatal poison. We again suppose, (and we have seen such a thing,) a prescription intended to act as a purgative, contained tartaric acid

and potass in conjunction with the sulphate of iron—the result would be a tonic which would, at least, frustrate the intentions of the medical attendant, and *might*, under certain conditions, produce even fatal effects.

It is clear, then, that while a knowledge of pharmacy is essential to the medical practitioner of every grade and of every kind, chemistry is one of its most important adjuncts and that without it, our knowledge must be imperfect, and our practice empyrical, subject to frequent ridiculous and in some cases fatal mistakes.

It may be asserted, that the dentist has no business with the general treatment of his patient, but conceding this, does it follow that he can practice scientifically *his* branch of the profession if his knowledge be so disjointed that it begins and ends with the mouth; and *may* not cases arise in which from the inability of a patient to remunerate *two* separate practitioners, he may be *obliged* to take the case into his own hands? or, again, if ignorant of medical science generally, how can he be certain that the applications he prescribes for the mouth, may not have a dangerous or even fatal effect upon the body? Such things *have* occurred, and as the dental practitioners are better educated than they are wont to be, will occur again and again.

Chemistry, however, has other and important connections with medical science, it teaches us the nature of different bodies, enabling us to separate the various elements of which they are composed into elemental particles, to ascertain the different proportions of their component parts, and the action not only on each other, but on others with which they may be brought into contact.

Thus, while this science shows us the nature and proportions (at least as far as our present knowledge extends) of all bodies, natural philosophy, or physics, examines and ascertains the reciprocal action of matter in masses, so that it is as impossible to separate chemistry from physics as it would be to understand pharmacy without its aid; neither the one or the other can be properly understood, unless chemistry forms one of its fundamental studies.

But chemistry is divided into seven or eight branches, which, though it is not our intention to investigate in this paper, we will enumerate. Thus, we have meteorological, geological and agricultural chemistry, then comes medical chemistry, which again is subdivided into physiological chemistry, or that which considers the changes produced in animal matter in the operations of healthy life—pathological chemistry which treats of the changes caused in animal substances by disease, or in other words, diseased changes in the structure of parts. Therapeution, pharmaceutical chemistry which teaches the nature of different medical remedies, the means of preparing and preserving them intact. And hygietic chemistry, by which we learn the means of arranging our habitations in the measure most advantageous to health, and are taught to select food the best suited to our wants and constitutions.

In viewing this brief outline of the different branches of chemical science, its important connection with all the arts and sciences is self-evident, and why dental surgery which should embrace not only the whole range of medical education, but in addition requires an intimate acquaintance with the laws of mechanism, should be exempt from its influence is a question beyond our powers to answer.

To apply chemical knowledge with advantage to the dental art, the practitioner must be in possession of its theories and the laws by which they are regulated, but more especially conversant with those branches of the science on which he will have to call most frequently for assistance, viz. physiological, pathological, therapeutic and mineralogical chemistry.

A knowledge of the nature of the enamel, of the saliva, of the tartar, and various concretions occasionally found in the mouth, have originated in chemical research—and the professor of the dental art who is ignorant on these subjects will cut a sorry figure, and search in vain for the explanation of phenomena that would be perfectly clear to the scientific practitioner, while his remedial means will be curtailed and uncertain.

We will take an example, and suppose that a portion of the

inferior maxillary bone has become affected through disease of the dental organs, situated in its immediate vicinity, here we should have occasion for the exercise of our knowledge of pathological chemistry.

Again, in the introduction of metals into the mouth, either for the purpose of stopping teeth, or replacing them with natural or artificial ones, an acquaintance with the laws of chemistry is essentially necessary to enable us to guard against any deleterious action on the parts, or on the system generally, that might arise from their decomposition, and the formation of some new compound, pernicious to health. This may be exemplified by using an improper quantity of copper as an alloy for the bases of artificial teeth, or by the employment of silver rivets to gold plates, in either case the acrid secretions of the mouth produce a constant series of galvanic actions, and the patient is never free from a nauseous and disagreeable taste of copper, more particularly when the stomach is empty, but more particularly in the composition of the various pastes or cements used to plaster up the teeth, and which from their being composed of a combination, or in other words, an amalgam of silver and quicksilver, act deleteriously not only on the teeth, but have, in more than one instance, caused salivation. Can any one who is not possessed of chemical and pathological knowledge, venture to employ arsenic in his treatment of the teeth? and yet there are cases in which even this virulent poison may, in the hands of a judicious practitioner, be valuable.

Unquestionably, then, chemistry forms an important branch of dental education; without its aid, the practitioner will be constantly making the most unscientific and ridiculous mistakes, inimical alike to the comfort and safety of his patient and his own reputation, his resources will be cramped and confined, and instead of having the power of thinking and reasoning for himself, and adapting his remedial means to the emergencies of each particular case with scientific skill and judgment, he will be bound down to precedents, fixed to a certain routine of practice, and, however successful in a pecuniary view, unable to attain scientific eminence, or to hold a place among the bene-

factors of his profession and mankind; he may be a tooth-drawer, may be able to stop, scale the teeth, or even remedy their morbid arrangements, but he will never be a *scientific* professor of dental surgery.

The science of comparative anatomy although not one that can be strictly considered a legitimate branch of dental education, is, as being of immense importance to the study of physiology, of great assistance to the dentist, and Haller justly observes, "that physiology has been more illustrated by comparative anatomy, than by the dissection of the human body." It is to this science that we are indebted for the classification of animals according to their anatomical structure; it is by its aid that we are enabled to ascertain the habits and the varieties in the construction of different animals which in this way afford data on which by inductive reasoning much benefit has been conferred on the human race; in short, it forms one of the links of the chain of natural philosophy which the more liberal opinion of modern times has, at least, tacitly considered as essential to the scientific practitioner of every branch of the dental art.

This applies generally to comparative anatomy, but when we consider the specific results that have occurred to the science of odontologia, the philosophical value attached to the teeth, as the most important means of classification in natural history, and that much has been done by microscopic investigation of their structure, to raise the art of dentistry, we must allow that comparative anatomy is of great importance in the education of the dentist.

It is generally acknowledged that professional men should, independently of their particular line of study, have a liberal and finished education, and what would be thought of him who was unacquainted with a science connected, however remotely, with his profession. Education is now so common that a gentleman in even respectable practice will meet with many patients having considerable knowledge on these subjects, and who would have little confidence in a professional attendant possessed of less knowledge than themselves on any subject connected with natural philosophy.

ARTICLE II.

A Course of Lectures on Dental Physiology and Surgery, delivered at the Middlesex Hospital School. By JOHN TOMES, Esq., Surgeon Dentist to the Hospital.

[Continued from page 54.]

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LECTURE VIII.—Continued.

IRREGULARITY IN THE POSITION OF THE WHOLE OF THE FRONT TEETH—IRREGULARITY IN THE CENTRAL INCISORES, IN THE LATERAL INCISORES, AND IN THE CANINE TEETH—IRREGULARITY IN THE BICUSPIDES AND MOLARES—IRREGULARITY IN THE POSITION OF THE WISDOM TEETH, AND THE CONSEQUENT DISEASES.

THERE is a fourth form of complete irregularity of the front teeth: it is this. The alveolar lines of the jaws are developed at such an angle with each other, that on closing the mouth the molar teeth alone come in contact, the front teeth being separated by a considerable interval. The models on the table present a well-marked case of this peculiar formation. If the defect in formation be discovered early in life, some attempt at restoration should be made by continued pressure under the chin; but if the deformity is found in the adult, the less you interfere the better, as your patient will have overcome, by habit, the inconveniences arising from malformation.

Partial Irregularity of the Front Teeth.

At present we have treated of irregularity affecting the whole of the front teeth; we shall now consider malposition when occurring to a part of the front teeth, and in doing so we will commence with the central incisores.

The central incisores, one or both, may project forward or retreat backward in an unnatural degree. Of these deformities the latter is the most common, and the one which we are the

most frequently called upon to remedy. The cause which usually produces these misplacements is the prolonged presence of the temporary incisores, which oblige the new tooth to take either a posterior or anterior position, while the milk teeth is forced outwards or backwards, the proper position of the new tooth being between the two positions.

The central incisores may, however, occupy the proper line, but yet be irregular. The teeth may be twisted on their axis, either towards or from the mesial line; that is, the mesial edge may be turned inwards while the internal side projects forward in such a manner that the cutting edges of the two teeth form an angle with each other, the angle pointing towards the mouth; or the position may be reversed, and the angle point outwards.

This form of irregularity is, like the last, produced by the relative position of the temporary and permanent teeth during the development of the latter. Thus the mesial angle of the cutting edge is placed anterior to the fang of the central, while the external angle is placed behind the fang of the lateral temporary tooth; or the position may be reversed, the external angle may be anterior to the fang of the temporary lateral. In each case, unless the temporary teeth are shed at an early period, the permanent tooth will, on coming through, be at an angle with the proper dental curve.

The presence of the temporary lateral, when the central is shed, may also lead to malposition of the permanent central, supposing the central be a large tooth, and the space destined for it be too small.

The lateral incisores are subject to the same forms of irregularity as those which occur to the central teeth, and, therefore, do not require a separate description. It may be observed that the more common malposition is the direction inwards, and consequent closure behind the teeth of the under jaw on shutting the mouth.

The causes producing irregularity of the lateral are similar to those effecting malposition in the central teeth, namely, want of space for them to take the proper position; the prolonged presence of the temporary teeth, irregularity of position as re-

gards the position of the fangs of the temporary teeth during development, or irregularity in the teeth of the under jaw, forcing the upper teeth on closing the mouth.

The canine teeth of the upper jaw may be turned sideways, may stand anterior to the adjoining teeth, which is the most common form of irregularity, or may incline inwards, which is the least common of the irregularities of position occurring to these teeth.

The circumstance of the late protrusion of the canine tooth in a small jaw is a constant source of irregularity; the incisores anteriorly, and the bicuspides and the first molar teeth, having taken their places posteriorly, insufficient space is left for the canines, and as they occupy when developing a rather anterior position in the jaw, they most commonly are evolved anterior to the neighboring teeth.

Treatment.—Whichever of the anterior teeth be the subject of malposition the same modes of treatment for the reduction of the irregularity are applicable. If, then, the front teeth are found, on examining the gums, to be out of position, the cause of the irregularity should be sought.

If there is a want of space, one or more of the temporary teeth should be removed, and the patient should be directed to press the new tooth frequently during the day towards the proper situation. The required position may, in some cases, where the irregularity is slight, be given to the new tooth by the frequent use of a piece of wood, shaped something like the handle of a spoon. The bent part should be passed behind the inward tooth, and the mouth partially closed, when the projecting portion of the instrument should be pressed downwards towards the chin. The under teeth will then form the fulcrum, and the upper tooth will be moved outwards. If the under teeth stand too much inwards the action of the lever may be reversed, and the upper teeth made the fulcrum. The teeth forming the fulcrum of the lever may also be moved, though probably to a much less extent than those acted upon by the end of the lever, as in the one case the pressure bears upon the concavity of the dental arch, and in the other upon the convexity.

If the teeth are sufficiently developed in length to pass behind the under teeth when the mouth is shut, these means will not be sufficient to restore them to a proper position, because the under teeth by their anterior position prevent them from coming forward. Our first step in the treatment must, therefore, be to remove the influence of the opposing teeth by placing caps upon the molars, which will so heighten them that on closing the mouth the front teeth do not come in contact.

Having accomplished this point, and ascertained that there is sufficient space in the proper situation, steady pressure must be made upon the irregular teeth. If one tooth only be displaced it may be sufficient to pass an elastic ligature behind or before (as the case may require) the irregular tooth, and then round the adjoining teeth, in such a manner that the ligature shall exercise a tractile force upon the tooth in the direction in which it should move. The best material for elastic ligatures is vulcanised caoutchouc.

If, however, the irregular teeth are well grown, the treatment by elastic ligature may occupy an inconvenient time, and it will be better at once to construct a plate fitting the palate, and thus gain a fixed point. If the teeth are in-placed, we may force them outwards by interposing pieces of compressed wood between the plate and the irregular tooth, or if the irregular tooth stand external to the proper line, an elastic ligature, or short bit of gold spiral spring, may be connected to the plate and to the tooth: the spring, by its action, will drag the tooth into its place. In most cases the tooth will move more quickly than the gum will absorb; it is necessary to bear this in mind, that sufficient space may be left for puckered gum.

A very simple and effective method of moving an upper tooth or teeth that are placed internal to the proper line consists in making an artificial elongation of the under teeth, the anterior surface of which inclining inward must pass, on closing the mouth, behind, and press outwards the in-placed teeth, while the base is fitted and firmly fixed to the under teeth. This instrument, which may be made of gold or of ivory, must be worn continuously by the patient till the irregular teeth have assumed the natural position.

If a tooth is twisted upon its axis, our treatment must be modified; pressure must then be made upon the side of the tooth which is most misplaced. But before proceeding to use mechanical means, observe whether the evil is kept up by the opposing teeth; and, on examination, you will frequently find that the edge, when the mouth is closed, rests between the two opposing teeth, one angle of the twisted tooth lying in front, and the other behind its opponents. In this case the molar teeth must be capped so as to remove the reciprocal action of the antagonist teeth. To one of the caps a piece of elastic gold wire may be firmly united; the free end must then be brought in front of the twisted tooth, upon the receding side of which it must be made to act. The better method of connecting the spring to the tooth is to fit with great accuracy a band of metal round the crown, to which band a small loop may be soldered; the end of the spring may then be drawn down and secured, by ligature to the loop. Or, instead of using the spring external to the teeth, we may attach a spiral gold spring to a fixed ivory palate, and to the tooth, through the medium of a band and loop, as in the former case, and thus turn the tooth on its axis till it assumes the proper line. I believe in a few instances the central or lateral incisores have been, by the use of the forceps, at once twisted into their proper position, and then secured by ligature to the adjoining teeth. I cannot recommend the practice, as it will, in many cases, be attended with the loss of the tooth.

It has been shown that pressure regularly applied upon a tooth in any other direction than in a line with its axis will gradually move the tooth in the direction of the pressure, whatever be the age of the patient: it follows, therefore, that dental irregularity may be reduced at any period of life. Whether it is advisable at all ages to reduce by mechanical means outstanding teeth is a question we must now consider.

If the patient be young, and the irregularity is not kept up by the closure of the teeth, it will be sufficient to remove the cause of the malposition by the extraction of the obstructing temporary teeth; or, if it be necessary, a permanent tooth.

The teeth will then during the general growth of the body, arrange themselves into the proper line. There is a strong tendency in the teeth to assume their proper relative position, and if the obstructive cause be removed sufficiently early, they will, though at first considerably out of place, gain of themselves the desirable position.

If, however, the irregularity is kept up by the closure of the antagonist teeth, the sooner after the full evolution of the tooth mechanical means are resorted to the better.

In the adult, if teeth are misplaced from want of room for a regular arrangement, one of the permanent teeth must be sacrificed; and it may, if the maxilla is very small, be necessary to remove a tooth from each side of the jaw. The tooth selected should be either the second bicuspid or the first molar; the reason for taking one or other of these teeth in preference to a more anterior tooth will be shown by a statistical table illustrative of the relative value in durability of each tooth. After making space by the removal of a tooth, the anterior teeth must be forced backwards by pressing between them small pieces of compressed wood, or India-rubber: the former by swelling, the latter by its elasticity, will force the teeth towards the vacated place. Having thus gained sufficient space, the irregular tooth must be brought into its place by the means I have before described; for we must recollect that in the adult the disposition in the teeth to assume the proper line no longer exists.

It is necessary to bear in mind, that although a tooth may be moved either from side to side, or backwards and forwards, yet that we have no power of lengthening a tooth. If, therefore, an irregular tooth be short, and its edge placed upon a different plane to the cutting edges of the adjoining teeth, and at the same time stands considerably out of line, it may be necessary to remove the tooth, even though it be a front one. For if you bring a tooth into the line, and when there it is shorter than its neighbors, it will still be unsightly. The canine tooth of the upper jaw is especially liable to come through the gum at a much higher level than the adjoining teeth, and if space be not afforded it to take its position the development of the tooth will be

completed in the irregular position. The crown will be the usual size, but the fang will be very short. When these cases are met with the tooth should be extracted, for it is not only irregular in position but in conformation, the fang being unnaturally short. Before sacrificing the tooth, we should satisfy ourselves that its development is completed, for if the fang is not fully formed, the tooth may be brought into its place, and the development of the fang will proceed. You will see how desirable it is to preserve the front teeth, and especially the canine, when we come to the statistical tables of the relative durability of the teeth.

A tooth that has been moved by pressure feels to the patient, and, indeed, is during the process, and for a short time afterwards, slightly loose, and exceedingly sore. In the young subject and in the adult the tooth on being left at rest soon loses this tenderness and fastens; not so, however, in the decline of life. On the contrary, pressure upon a tooth induces irritation in the gum and alveolus; the latter becomes absorbed, and the tooth when left at rest seldom becomes as firmly placed as before the operation, neither is the absorbed alveolus reproduced. In order to prevent any injurious motion in a tooth, after being by mechanical means brought into place, a silk ligature should be passed round the neck of this and the adjoining teeth, and securely tied. The ligature, if efficiently applied, will not only prevent motion, but will also counteract any tendency in the tooth to recede to its former position.

The bicuspid teeth are sometimes, from want of space misplaced; the crown may project inwards towards the tongue, or outwards towards the cheek. If the degree of irregularity be slight, the teeth being but little seen, may be allowed to remain; if, however, any inconvenience be felt, the irregular tooth should be extracted. Where there is a choice the second should be removed in preference to the first bicuspid.

The first and second molares are so seldom the subjects of irregularity in position that we may pass them over.

At present I have been speaking more especially of malposition of teeth of the upper jaw; what has been said of abnormal

position occurring of the one may, however, be applied to the other jaw. I need not, therefore, occupy our time with a description of the dental irregularities occurring in the lower jaw. The treatment will be similar in principle to that adopted for the upper teeth, though the apparatus must, of course, be modified to suit the form of the jaw. Thus, when we require a fixed point from which to act upon a lower tooth, it must be external to the teeth. The under teeth seldom require mechanical means to reduce them to regularity. In the first place they are in the majority of individuals but little seen; slight irregularity is, therefore, but little regarded. Then, again, the malformation is generally the result of want of space, and passes away on the removal of the crowding tooth. The tooth selected for removal should, in the majority of cases, be the first molar, from its great liability to early decay.

In describing to you the various forms of dental irregularity, and the treatment to be adopted, I have endeavored to lay before you the general principles, and especially as regards the treatment, in which I have described the plans usually adopted, in preference to giving an account of the construction of the instrument to be used in each case. I have done so, first, because we have not sufficient time allotted to us to go minutely into every part of the subject of dental surgery, and, secondly, because if I did, such information would be of but little value to those destined to practise exclusively medicine or surgery.

Irregularity in the position of the wisdom teeth demands our earnest attention, not so much on account of the disfigurement it may occasion, as on the serious and distressing disorders that are sometimes consequent upon misplacement.

The wisdom teeth of the upper jaw, when taking a false direction, give rise to great inconvenience, but the more distressing symptoms are generally connected with malposition in the inferior maxilla. I shall, therefore, direct your attention more especially to the latter, as in those cases we shall find the disorders similar, but more severe and better marked than when arising from the wisdom teeth of the upper jaw.

The third molar may be malplaced in five different directions.

First, it may grow obliquely forward with the masticating surface directed against the posterior surface of the second molar. Second, the crown may be directed outwards towards the cheek, and may even be imbedded in the cheek. Third, it may take an inward direction towards the tongue. Fourth, the tooth may be directed upwards in the coronoid process, either completely or partially within the bone. Fifth, it may occupy its natural position in the jaw, but be held down by indurated gum.

If we recall to our minds the progressive stages of the development of the three molares we shall be able to assign the causes of these various forms of irregularity. You will remember that, immediately after the development of the sac for the wisdom tooth, it ascends into the coronoid process, that the ramus of the jaw increases in length, and that when sufficient space is formed the sac descends and forms a line with the more anterior teeth; but if fro many cause the jaw ceases to elongate when the sac occupies the coronoid process, the tooth will be developed in that situation. On the other hand, if the maxillary growth stops when the sac has descended to the angle only, the tooth will be directed forwards. Again, if growth should cease when the tooth has descended and fallen into the line, but before sufficient space has been formed for its evolution in the vertical direction, the tooth will be directed outwards or inwards, taking that direction in which the least resistance is offered. It may happen, however, that although there is sufficient space, in the alveolar line, yet the wisdom tooth does not appear through the gum, arising, as far as we can tell, from the presence of a thickened and indurated gum, which offers effectual resistence to the eruption of the tooth.

Cases illustrative of the evils that occasionally arise from the various forms of malposition of the wise teeth not uncommonly present themselves to our notice. I shall, however, place before you several cases related by Velpeau; first, because they are very instructive in themselves, and secondly, because they come with the weight of his authority.

I should also, but for the want of time, cite some cases from Dr. Ashburner, to whom the profession is deeply indebted for

bringing before their notice the various evils that may and sometimes do arise from malposition of the wisdom teeth.

CASE 1.—"A lady, at the age of 22, began to feel a dull pain at the angle of the lower jaw on the left side of the face; the pain soon extended to the adjoining teeth, but was distinct from toothache. As the pain continued to increase in intensity for several months it was thought to be a case of rheumatism, and as such was treated, but without good effect; then blisters, and a seton at the back of the neck, kept open for a month: opiates were given, but all to no purpose. She went and resided at a watering place for some time, but came back to Paris nothing benefitted. At this time the teeth were all good in appearance, the gums healthy, and nothing denoting the eruption of a wise tooth. However, upon making a section of the gum over the wise tooth, a probe passed down led to the discovery that the wise tooth was arrested in its progress by the direction it had taken directly forwards, its crown coming in contact with the posterior surface of the second molar. The second molar was extracted, and the patient immediately released from her suffering."

CASE 2.—"A lady, 29 years of age, sought advice on a painful tumor in the cheek: it had existed for several months. On examination, it was found to arise from the wise tooth projecting horizontally outwards, and lodged in the parietes of the cheek. So soon as the mouth could be opened sufficiently wide the tooth was extracted, and the patient soon recovered."

CASE 3.—"A gentleman, of 45 years of age, had suffered from an ulcer on the side of the tongue, near its base. This ulcer he conceived to be syphilitic, and so was salivated as a means of cure. The salivation, however, made it much worse. After a while, on application to Velpeau, it was found that the wise tooth on that side was directed inwards, and projecting into the mouth had occasioned the ulcer on the tongue: the tooth was extracted, and in a few days the ulcer healed."

CASE 4.—Patient F. Boulanger applied to Velpeau in 1825. The right cheek greatly swollen, the tumefaction extending from eyelids to the clavicle; several cicatrices, resulting from old ab-

scesses, mark the skin in this neighborhood. For the last twenty months the patient has not been able to open his mouth, and has therefore subsisted on broths. Three inches down the neck from the angle of the jaw there is a fistulous opening, through which much pus is discharged; lower down the neck there is another fistulous opening. On passing a probe into the first of these openings it penetrated obliquely backwards about three inches, and then was stopped by a hard body, which proved to be the dens sapientia. The patient's health had suffered much from frequent attacks of colic and diarrhœa, indigestion, &c. The mouth was gradually forced open by the introduction of bits of cork and wood between the teeth; the process was tedious but successful. The tooth was extracted, and in five or six days a sequestrum was discharged which seemed to belong to the coronoid process; it bore the mark of the crown of the tooth, and thus indicated the obstacle which had opposed the development of the tooth. The second molar was now extracted: eight days afterwards a second piece of bone was removed; and from this time the tumefaction of the neck and face disappeared so rapidly that at the end of twenty days the face had resumed its natural appearance.

CASE 5.—A gentleman of fifty years of age had, during the last two years, suffered excessive torture. The right side of the face was greatly swollen and disfigured by sores from old abscesses; the neck, also, was also swollen down to the clavicle, and marked in a similar manner; the mouth remained half open, and was distorted, the lower teeth not corresponding in range with the upper. The general health of the patient had been considerably affected by his sufferings. For the last four months he labored under constant diarrhœa; fetid saliva, mixed with pus, flowed constantly from his mouth. He was feeble, emaciated, and unable to walk without the support of two friends.

A mass of fungous flesh, which occupied the whole of the mouth on the diseased side, was freely divided, and, after a long examination, a wise tooth was found in the base of the coronoid process. The tooth and the whole of the process were re-

moved, as were also several portions of the maxillary bone, with loose teeth. Within a fortnight all the bad symptoms had disappeared, and nothing remained but the deviation of the mouth, which was finally overcome by means of a bandage.

Case 6.—Dr. Fricard, when a student, was attacked, in the summer of 1821, with pain in the throat, and in the following November with severe inflammation of the right tonsil. This condition was partly subdued by antiphlogistic measures; but the pain soon returned, and continued, in spite of every means, up to the year 1823. The teeth and gums appeared to be perfectly healthy, and the surgeon was about to extirpate the tonsil, when it was accidentally discovered that the wise tooth on the affected side was not through. The gum was now freely divided, but the portions of the divided gum inflamed, and had to be removed with the knife and caustic. The tooth was thus completely freed, and the obstinate inflammation of the tonsil soon disappeared.

Case 7.—M. Esquirol informed Velpeau that he had a case of mental derangement where the patient was restored to reason by a crucial incision division of the gum, which liberated the wise tooth.

These cases were related by M. Velpeau in a clinical lecture which was reported in the Medical and Surgical Journal in 1841.

We should at first sight scarcely expect that consequences so serious would arise from the development of the wisdom teeth, when occupying an abnormal position; neither do they necessarily occur when the teeth occupy either of the situations I have described. Before serious and painful results can arise there must be a concurrence of many circumstances. The patient must be of strumous constitution or predisposed to inflammatory action, or the nervous system must be peculiarly susceptible of excitement; in which case epileptic fits may supervene upon any interruption to the advance of the wisdom teeth. That epilepsy does arise in some cases from this cause is proved by its appearing when the teeth are passing towards the surface, and disappearing when passage is given to the teeth by removing the obstructing cause. I have, within a few weeks of this

time, known of three cases which have occurred in the patients of medical friends, where fits have commenced when wisdom teeth were presenting, and which were completely removed by free incision through the indurated gum over the teeth. As a precautionary measure, lint should be placed in the incisions to prevent the union of the divided surfaces, otherwise the symptoms may recur.

I have during the last two years seen four cases in which the teeth presented with the crown forward, and produced great pain about the angle of the jaw, extending to the neck and shoulder or to the side of the head. In each case the wisdom teeth were removed. The operations were attended with considerable pain, but it is better that pain should be suffered than that the second molar should be lost in order to give space for a tooth which, when fully developed, will be useless in mastication.

The wisdom teeth when malplaced are wholly useless in mastication; we need not, therefore, hesitate to remove them whenever they give inconvenience. These teeth, although in their proper situation in the jaw, yet may, from their closeness to the ascending ramus, give great inconvenience, not from want of space for the tooth itself, but from the mucous membrane of the ramus lying over the posterior surface of the teeth, and being, consequently, subject to injury from the upper teeth whenever the mouth is closed. Inflammation is thus produced, which in a susceptible subject will not only be kept up in the injured tissues, but will extend to the throat and tonsils, and then remain in a chronic state so long as the cause is allowed to exist.

In these cases the better remedy is to remove the tooth, seeing that, from its position, it is wholly useless; or, if this be objected to, the overlapping piece of membrane should be removed with a pair of curved scissors; a remedy may also be effected by the frequent application of caustic.

It is obvious that the evils produced by the development of irregularly placed wisdom teeth arise wholly from pressure produced by the gradual growth of the dental pulp, preparatory to its calcification; by which the superimposed tooth is forced

against the tissues by which it is covered. In the natural course of things these tissues are absorbed, and make way for the rising tooth; but if they are not absorbed, and, therefore, resist the advance of the tooth, the pressure reacts through the tooth upon the developing pulp.

The pulp is very plentifully supplied with nerves, and, moreover, is placed immediately over the large dental nerve (at least in the under jaw.)

We all know that pressure upon a nerve or nerves, though slight in degree, will produce more or less pain, and that the pain will be felt in the part to which fibres pressed upon are ultimately distributed. Instead, then, of being surprised that interruption to the growth of a tooth should produce pain extending through the whole jaw, or to the side of the head, or about the ear, we should be led to infer that such phenomena would exist. It would be, perhaps, difficult to estimate the actual amount of mechanical force developed by a growing tooth, but we may form some estimate by observing the force generated by growing vegetable. We have most of us seen a tolerably weighty piece of stone raised by the growth of a plant beneath, any fibre of which may be readily crushed beneath the thumb and finger.

Pressure, moderate in degree and equally applied, will lead to the absorption of tegumentary tissues; but if the pressure be great, and unequally applied, instead of absorption we have induration and pain—a fact those who have worn tight boots are willing to admit. If a tooth be developed more rapidly than the superimposed gum is absorbed, gradually increasing pressure will be applied to the gum, which will then become indurated and painful, and the symptomatic disorder I have alluded to may arrive.

In all cases of inconvenience arising from malposition of the wisdom tooth, either the tooth itself or the parts obstructing its development must be removed.

The evil will, however, if not in itself considerable, and the patient has sufficient endurance, after a time terminate. The development of the tooth will cease in the formation of very

short fangs, and the pressure no longer generated, will cease, and the patient will be restored to comfort.

I have omitted to mention, that irregularity in position is sometimes caused by tumors growing from the gums or alveoli, but as we shall, in a future lecture, consider the history of diseases of that nature, I need not detain you now by describing their effects.

LECTURE IX.

OSSEOUS UNION OF TEETH TO EACH OTHER—UNION OF TEETH TO THE ALVEOLI—MECHANICAL INJURIES—FRACTURE OF TEETH—FRACTURE EXTERNAL TO THE PULP CAVITY—THROUGH THE PULP CAVITY—THROUGH THE FANGS—UNION OF FRACTURED TEETH—DILACERATION OF TEETH—INJURIES OF THE PULP—DISLOCATION OF TEETH—FRACTURE OF THE ALVEOLI.

Irregularity in the Structural Relations of the Teeth with the Adjoining Tissues.—It is by no means uncommon to find the fangs of a molar tooth, which are usually separate, united; but further there are many well authenticated cases where the fangs of two adjoining teeth have been permanently connected. A case occurred in the practice of my friend Mr. Rogers, in which the second and third molares of the upper jaw were firmly united. If my memory does not fail me, the wisdom tooth was decayed and painful. On attempting to remove the offender, both teeth came out, and it was then found that they were united by their fangs. It is probable that junction was effected between the bone or cementum of the fangs. Although such cases are rare, yet there are a sufficient number recorded to establish the fact. Mr. Bell describes several cases from preparations in his own possession. In the American Journal of Dental Surgery, an instance is mentioned in which the lower bicuspides were joined.

Before we leave the subject of dental union, I shall take the opportunity of bringing before your notice a very interesting specimen which I had the good fortune to procure from an ivory dealer.

The tusk of the elephant grows during the whole life of the animal; the older the elephant, the larger the tusk. Usually there is a single tusk developed from each side of the upper jaw. In the specimen before you, three tusks have grown from one side—a large one above, and two smaller ones immediately below. But the great peculiarity exists in this, that the apices of the smaller ones are united to the under surface of the larger one. The union is affected not by the dentine of the three, but solely by the cementum. Each tooth has its separate alveolus and pulp cavity. Portions of the alveoli are still adhering to the surface of the lesser tusks.

Osseous union between the Teeth and Alveoli.—The fact as to whether the fangs of teeth are ever connected to the alveoli by osseous union, is not at present established. I have seen a specimen of a milk-tooth which remained in the adult jaw, and seemed to be united to the bone, but as a section of the parts had not been examined by the microscope the fact could not be considered as established. There seems no reason why union should not, under some circumstances, take place, yet, if such does occur, the cases are very rare, and are, therefore, practically unimportant.

Mechanical Injuries of the Teeth—Fracture.—The teeth, as well from their peculiar function as their exposed situation, are very liable to be fractured. The fracture may be external to the pulp cavity, in which case it may be termed simple, or it may extend through the pulp cavity, and thus constitute compound fracture. Compound fracture may be confined to the tooth, or may be accompanied by fracture of the alveolus.

Fracture of teeth external to the pulp cavity, or simple fracture, may be produced by the violent closure of the antagonist teeth, by biting any hard substance, or by a blow. If the dentine be exposed, pain will for a time be felt on subjecting the tooth to the contact of cold fluids, or even a current of cold

air. A peculiar and destressing sensation is produced by any foreign body coming in contact with the exposed dentine. If left to take its course the pain and sensitiveness may wholly cease, or, on the other hand, the pulp may become inflamed, and the tooth consequently lost.

Treatment.—If the fractured edge of the enamel be rough, or unpleasantly sharp, a fine file should be used. The sensitiveness of the dentine may be destroyed by the application of an escharotic; nitrate of silver, potassæ fusas, or chloride of zinc in the state of powder, may be rubbed over the surface with a piece of wood rendered rough at the extremity, so that it will take up a little of the remedial agent: no doubt, there are many other substances which would answer the purpose. Those I have named will, however, prove efficient.

Fracture through the pulp cavity is of very frequent occurrence, and is usually the result of a blow or a fall. It may possibly be produced by the violent action of antagonist teeth when the muscles of the jaw are affected by spasm; though such a case has not come under my own immediate notice. The fracture may be situated in the crown, or in that part of the tooth which is enclosed within the alveolus, but as the two cases may lead to somewhat different results we will consider them apart.

When the injury has been confined to the crown, the fractured portion will of course be detached, and leave the pulp and surface of the dentine exposed to external influences. After an accident of this nature you will find the pulp projecting from the fractured surface, and extremely sensitive to the slightest touch, even of the tongue. Inflammation will shortly commence in the exposed pulp, from which it will extend to that portion situated in the fang, and from thence proceeded to the periosteum of the fang and alveolus. The inflammatory action may not stop here, but may extend further, and involve the periosteum of both the external and internal plates of the alveoli, and also involve the gum. In this case you will find considerable swelling of the face, diffused pain over the parts involved, accompanied with the constitutional signs of inflammation.

If allowed to take its course, the inflammation will terminate in the death of the pulp, and in the formation of pus in the alveolus, which will find its way down the side of the tooth, and be discharged under the edge of the gum, or a canal will be formed by absorption through the alveolus and the gum, and the matter will issue through the opening, which is commonly situated opposite the apex of the fang. Free exit being given to the pus, the inflammation will now abate, and the pain and swelling will subside with the escape of the matter. The tooth will become gradually dark in color. The secretion of pus will continue, though the quantity discharged may be so slight as to escape notice.

These are the consequences which, if no preventive means be used, usually follow upon a tooth being fractured through the pulp, and the pulp exposed but not destroyed. But if the accident occur in a strumous constitution the results may be more serious; the neighboring teeth may become involved in the inflammation, and the alveoli suffer necrosis; so that instead of the injured tooth alone being lost, the adjoining teeth, with the enclosing alveoli, may be destroyed.

The pulp may, however, be destroyed by the force which occasioned the fracture of the tooth; thus if the crown be broken off near the neck the pulp will probably be torn out of the fang by the detachment of the crown. On the other hand, the tooth may have been so moved in its socket that the vessels and nerves are severed at their entrance into the fang. In either case there is much less risk of inflammation than where the pulp is exposed to the immediate action of air, and the various substances taken into the mouth. The exposed surface of the dentine is in most cases for a while very sensitive, but the sensitiveness gradually subsides: the tooth becomes discolored, the discoloration commencing around the vacant pulp cavity, and extending outwards.

In a susceptible subject, however, you may have considerable inflammatory action following much the same course as occurs in those cases where the pulp is exposed but not destroyed.

In the most favorable case there is an attempt at reparative

action. If the pulp be torn across half way down the fang, the remaining portion of the pulp will in the course of a little time seal up the exposed aperture of the cavity of the fang with newly-formed dentine, just as we see the cavity obliterated by new dentine in the fangs of teeth which have been much worn by mastication. In the one case the injured pulp withdraws itself from external influence by forming a layer of dentine on its exposed surface, and in the other by adding new dentine to the inner surface of the pulp cavity as the external walls are thinned by wear.

Treatment.—If the fang of a front tooth be sound, and the adjacent parts free from inflammation, a new crown may be pivoted upon it in such a manner that the artifice cannot be detected unless very closely examined, and the crown will answer all the purposes of the original one. (The manner of performing the operation I shall describe to you in a future lecture.) Hence, in many cases it will be desirable to preserve the roots of a tooth from which the crown has been broken. To effect this we must if the pulp be exposed immediately destroy it by thrusting into the cavity a small steel instrument; and when it can pass no further, from the narrowing of the canal as it approaches the end of the fangs, roll it between the finger and thumb; this will completely destroy the pulp soon after its entrance into the tooth; the coagulum formed from the torn and bleeding vessels will protect that little which remains. Having destroyed the pulp we may proceed to fix on by means of a pivot the new crown. Some dentists use platinum, or steel-wire, heated red hot, for destroying the pulp, under a belief that when the actual cautery is used the patient is less liable to an attack of inflammation of the alveolar periosteum as a result of the operation.

Four years since a gentleman had the central incisores broken off by a blow from a ball. I saw him on the same day. The pulp in each tooth was destroyed for some distance down the fang. The stumps were pivoted. No inconvenience followed the operation, and at the expiration of three years the roots of the pivoted teeth seemed perfectly free from disease.

Such should be our treatment if the fang be firm in the alveolus, and the patient applies to you before inflammation has commenced; but if the root be loose, from the blow which fractured the crown, or if the indications of inflammation are present, you should at once extract the root. If there is considerable inflammation about the alveolus, the patient should, after the removal of the tooth, be directed to foment the part freely, by taking into the mouth a strong decoction of poppy-heads, and at the same time an aperient should be given to reduce constitutional excitement.

If the accident has occurred at some distant period, and the now empty pulp cavity has its walls discolored, it will be inexpedient to pivot on a new crown, as in all probability the cavity gives passage to some slight discharge, which in being blocked in by the pivot will lead to abscess in the alveolus, for the relief of which the root must be extracted. You will in some cases find that pus, instead of passing out through the cavity, makes its escape through a small fistulous opening opposite the end of the root. In such a case pivoting may not make the matter worse, but as disease about the fang of one tooth is apt to extend to the adjoining tooth, it is far better to remove the root.

Fracture of the Root.—The root of a tooth, you are aware, is invested with periosteum, and fracture may occur without that membrane being detached, except at the line where the fracture has taken place. The tooth may, therefore, be retained in its place. If, however, the force causing the injury has been great, the fractured part may have been knocked out. The alveolus, by the same blow, may have been fractured, in which case there may be great displacement of the tooth, and in some instances without detachment from its socket. The direction of the fracture may be either transverse or oblique, and may itself be either simple or comminuted. The pulp, if the force causing fracture has not produced much displacement, may be but slightly injured, and vitality therefore preserved throughout its whole length; on the other hand, if the displacement has been considerable, it must be torn across, and that part external to the seat of fracture destroyed.

You will recognise fracture of the fang of a tooth by the crepitus that will be felt on moving the crown. The fractured tooth, if left to itself, will, in many cases, produce inflammation and pain in the alveolus, which may oblige the removal of at least the fractured portion. This will not, however, be the necessary result; the fracture may unite.

It has been believed that a union of a fractured tooth could never occur, but the preparation which I am enabled to show you, through the kindness of my friend, Mr. Saunders, whose property it is, shows that union not only can, but in this instance has, taken place. The tooth is a central incisor of the upper jaw; the fracture extended obliquely through the middle of the fang, and was obviously attended with slight displacement, in which position perfect union has taken place. Several small nodules of dentine mark the line of union, the oblique direction of which, together with the displacement, are so well marked that there can be no doubt of the producing cause of the present appearance of the tooth—namely, fracture and subsequent union.

A second case of union is recorded in the American Journal of Dental Science, where you will see a wood-cut representing an incisor fractured near the neck, with the crown bent at a right angle with the fang, and in that position united.

It will not be difficult to understand how a tooth fractured through the fang may be united, supposing the pulp be not destroyed by the injury of the dentine. You have seen that when the surface of a tooth is worn, the pulp forms dentine in the cavity opposite to the worn external surface, and I shall show you that when a tooth becomes decayed, the pulp will, in some cases, form dentine in the pulp cavity, opposite to the seat of the disease situated on the external surface. The process of development in the two cases is similar to that engaged in the formation of the dentine of the body of the tooth. In each case we recognise reparative attempts, and also an unquestionable proof that where there is dental pulp, there we may have, under favorable circumstances, dentine developed. If, then, a tooth be fractured through the fang, and the pulp be not de-

stroyed, a process may be set up similar in every respect to that effecting the union of fractured bones.

If we examine osseous union we shall be able to trace the following steps up to the completion of the process. Thus, the immediate consequence of fracture of a bone is the effusion of blood from the lacerated vessel of the injured part; this is followed by effusion of liquor sanguinis or lymph; the formation of cartilage between the fractured extremities then succeeds, and after a while the cartilage is converted into bone, and the union is complete. Similar action would no doubt arise when dental union takes place, but instead of cartilage we should have dental pulp, which would be converted into dentine. Numerous specimens of hypertrophy of the cementum attest that whenever there is dental periosteum there may be formed dental bone or cementum. The bony layer of the fang may, therefore, under favorable circumstances, be united.

Treatment.—If the fracture be situated about the middle of the fang, or near the neck, and the body of the tooth be knocked out, the remainder of the root, if painful, should be extracted; but if a small portion of the fang only remain in the alveolus, it is not well, unless it be painful or loose, to attempt the removal, as the operation would be attended with considerable pain. A small piece of root very seldom gives any inconvenience, and is, after a time, by the deposition of bone in the alveolus, brought towards the surface and thrown off, or it may be impacted in bone, and there remain without giving any evidence of its existence. Such has evidently been the case in the specimen before you; the bone is here closely fitted to the surface, even to a somewhat irregular fractured surface. Had there been any inflammation excited by the presence of the fang, we should see evidence of its existence in the adjacent bone. Instead of that, however, the texture of the bone immediately in contact with the root is free from unusual porosity common to inflamed bone, and is exactly similar to other parts of the maxilla.

Again a small portion of the fang of a fractured tooth may wholly or in part become absorbed. It must not be denied,

however, that, in a few cases, the remaining portion of the fang of a fractured tooth will produce inflammation, and subsequently a gum-boil, which, had the stump been removed, would probably have been avoided. If after fracture the crown be not detached, but yet feels very loose in the gums, it should be removed; or if the gum be inflamed, it should be removed whether loose or not. Should, however, the fractured tooth be tolerably free from pain, and the gum from inflammation, and at the same time be held tolerably well in its place, we may attempt to get an union of the fractured surfaces. If we could insure perfect absence of motion in the tooth, it seems probable, judging from the specimen before us, that union might be effected. It will, however, be extremely difficult to insure perfect rest in the parts, and we know that even a bone will not unite unless there is perfect absence of motion between the fractured extremities, and much less would a tooth, when the nature of the new tissue, namely dental pulp, is much less firm, and therefore more readily injured than cartilage. From these circumstances our chances of success will, I fear, be small, though I think the chance worth the trial.

If several teeth with their alveoli are fractured, and there is displacement, the whole should be brought back to the proper position, and the patient should be enjoined to avoid all causes of motion in the injured part, which should be fomented, by taking into the mouth hot poppy-head fomentation, which should be renewed as soon as it cools. The general health should also be attended to, and aperients given if necessary.

Dilaceration of Partially Developed Teeth from the Formative Pulp.—By this I mean the forcible separation of the cap of developed dentine from the pulp, in which development of dentine is still progressing. I have but little experience in accidents of this nature. Dilaceration is of course the result of mechanical violence. Two cases have come under my notice, in which after severe injury to the jaw—in one from the kick of a horse, in the other from a fall—partially formed teeth came away, with necrosed bone. I am, however, through the kindness of my friend, Mr. Saunders, enabled to show you a spe-

cimen, in which there has been perfect reunion after dilaceration, and the development of the tooth has been perfected.

In this specimen the accident has evidently occurred subsequently to the development of the enamel, and there are also indications that there was slight displacement consequent upon the injury.

There is a distinct line of demarcation between the dentine formed before and subsequent to the accident; indeed the great distinctness of the line throws some doubt as to whether there is perfect reunion in this tissue. The dentine developed immediately after, and by which the junction or reunion is effected, is perforated by numerous canals, which were probably occupied by vessels, but which, like the vascular canals in the antler of the stag, become partially obliterated on the organ reaching maturity. The thickening or ridge on the external surface of the tooth consists of cementum, in which the reunion is very perfect, and is, I believe, perforated by vascular canals. The pulp cavity, you will perceive, is situated low down in the fang of the tooth, and at the upper part is studded with two small nodules of dentine. I have not seen a specimen which could be viewed microscopically by transmitted light, so that I cannot describe the structure more minutely.

The subject of reunion after dilaceration, though interesting physiologically, is practically of little value. The accident rarely occurs, and then is either not recognised, or if recognised is involved with such extensive injury of the adjoining parts, that there are no hopes of its coming into operation.

Mechanical injuries of the formative pulp, with partial dilaceration, though unknown in the human teeth, are occasionally met with in the tusks of the elephant, or perhaps I should speak more correctly if I say the results of such injuries are occasionally recognized in the tusks. Most museums possess specimens of tusk, in which balls are impacted, and everywhere surrounded with dentine. On close examination, it will, as far as my experience goes, be found that the dentine near the surface of the ball is slightly peculiar; that it has a translucent horny look, and in some specimens has a laminated appearance.

Before the development of dentine was understood it was extremely difficult to explain how ball should get into the solid part of a tooth. We can now, however, see that if a solid substance be lodged in the pulp, and remains there without producing inflammation, that it must, on the pulp becoming dentine or cement, be enclosed in the solid substance of the tooth, just as it was before enclosed in the pulp. But if the pulp near the foreign body be destroyed, then dentine is deposited at a short distance in such a manner as to enclose the ball loosely in a case, and at the same time protect the remainder of the pulp. The specimen on the table illustrates this point. The missile has evidently entered through the base of the tusk, and passed into the enclosed pulp. The fracture is unrepaired, but a loose case is formed round the ball, with an opening kept from without. This, which shows the marks of the fracture in their outline, has all the edges of the aperture rounded.

Dislocation of Teeth.—Dislocation may be partial or complete; that is, the tooth may be loosened considerably, and hang in its place, or it may be so completely detached from its articulation that it falls from the socket. Further, it may be complicated with fracture of the alveolus, or, on the other hand, the tooth may be driven up into the nasal cavity. Mr. Bell cites a case of this kind, which came under his immediate notice. Dislocation is always produced by mechanical violence when occurring suddenly, or by the growth of a tumor, or by deposition of bone in the socket, when occurring gradually. A front tooth is occasionally seen lengthened beyond its fellows; this arises from the gradual filling up of the alveolus from the bottom by the deposition of bone; hence the tooth is forced out, and appears to have lengthened.

If the dislocation be incomplete, and there be no injury to the jaw, the tooth will, if kept quiet, in a patient having a good constitution, become firmly refixed; but, on the contrary, we may have inflammation set up which will extend to the neighboring parts, and produce great mischief.

If the dislocation be complete, with but little injury to the alveolus, and the tooth has fallen out, the jaw usually gives but

little trouble. It is common for a patient after the skilful extraction of a tooth from an uninflamed jaw to feel no subsequent pain whatever. If the dislocated tooth be driven into the jaw, great pain and active inflammation of the injured part may occur in any case, and will almost surely, if the tooth be not removed.

Treatment.—If a sound valuable tooth be completely dislocated, the alveolus should be immediately cleared of coagulum by the use of a strip of lint and a probe. The tooth should then be returned to its place, and fixed so as to prevent motion, by a silk ligature round the adjoining teeth. The patient should be cautioned against disturbing it by any attempt at mastication on that side of the mouth. By these means a dislocated tooth will often become firmly replaced in the jaw, though occasionally you will have inflammation arise as a consequence of the attempt. In all cases there will be some tenderness, and the tooth will for a short time be elongated and tender; a circumstance arising from swelling of the alveolar periosteum, and consequently slight displacement of the tooth. If, however, the tenderness be great, and accompanied by constant pain, all attempts to induce reunion should be abandoned.

Supposing a tooth to have become quite firm after dislocation, it does not follow that it will continue serviceable for any great length of time. Usually such teeth become discolored, being partially dead; from the connection with the vascular system existing only through the dental periosteum, and not through the pulp. The consequence is, that gum-boils not unfrequently appear, and these, if severe, may oblige the removal of the tooth; still, I have seen several cases in which teeth removed by mistake were returned to their alveoli united, and were useful for years.

If the dislocation be partial only, the tooth should be pressed back into its proper position, and in most cases it will unite to the alveolar periosteum. There is frequently a little difficulty in returning the tooth when the alveolus has become occupied by a coagulum. Firm pressure should be used, and when in place the tooth should be tied to the neighboring teeth.

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You will have frequent failure, but yet it is always worth while to attempt to save a sound tooth, even if the chances of success are small.

If the dislocated tooth be driven into the antrum, or into the jaw, it should be immediately removed, otherwise inflammation will arise, which may end in necrosis of the injured bone.

Mechanical Injuries of the Alveoli.—Fracture arises from the same cause, and is usually connected with, fracture or dislocation of teeth. In some cases it is the result of unnecessary force, or force injudiciously applied in the extracting teeth. The extent of fracture will be in proportion to the degree of mechanical violence producing it, and may be confined to a simple fissure, or one or more pieces may be broken off. Fracture of the alveoli is necessarily concomitant with fracture of the jaw; but as this forms a subject in the surgical lecture we shall not touch upon it here.

It rarely happens that slight fracture of the alveoli in a perfectly healthy person is attended with serious inconvenience any further than some slight pain for a few days. If, however, your patient be in an unfavorable state of health, then necrosis of at least the injured portion, if not more, of the alveoli may be feared.

Treatment.—No doubt slight fracture is a very common result of the extraction of the teeth, as well as of other injuries of the teeth; but when the fracture is slight, and is, in fact, nothing more than a fissure, with but little separation, we have no means of ascertaining its existence, neither would the knowledge, could we obtain it, be of any practical value. Should, however, you detect a piece of alveolus broken from its connection with the maxilla, and attached only to the gum, it had better be removed, otherwise it will occasion irritation until it is thrown off by natural efforts.

Two cases have come under my notice where large portions of the alveoli have been torn away with the teeth, and in each the exposed surface of bone exfoliated. In the first case the two bicuspides and canine were removed with the enclosing alveoli in an effort to remove the second bicuspid with the key.

In the second case two molares, with their alveoli, were removed in the same manner, and the mucous membrane of the palate torn across as far as the soft palate. The patients applied to the hospital in consequence of the injuries received in the operations.

It is very common for a small bit of the edge of the alveolus to be found adhering to the neck of the tooth after removal. This amount of injury is very seldom of any account, neither need any treatment be adopted.

I need not detain you with any account of necrosis, as you will hear from Mr. Arnot or Mr. Shaw a far better description of that disease, whether situated in the jaw or elsewhere, than I should be able to furnish.

ARTICLE III.

Account of a New Anæsthetic Agent, as a Substitute for Sulphuric Ether in Surgery and Midwifery. Commuuicated to the Medico-chirurgical Society of Edinburgh, at their Meeting on 10th November, 1847, by J. Y. Simpson, M.D., F. R.S.E., Professor of Midwifery in the University of Edinburgh; Physician-Accoucheur to the Queen in Scotland, etc.

From the time at which I first saw ether-inhalation successfully practised in January last, I have had the conviction impressed upon my mind, that we would ultimately find that other therapeutic agents were capable of being introduced with equal rapidity and success into the system, through the same extensive and powerful channel of pulmonary absorption. In some observations, which I wrote and published in February last, relative to the inhalation of sulphuric ether in midwifery, I stated that, in several obstetric cases, I had used ergot of rye in this way, along with ether.—(See *Monthly Journal of Medical Science*, p. 724.)

With various professional friends, more conversant with chem-

istry than I am, I have, since that time, taken opportunities of talking over the idea which I entertained of the probable existence or discovery of new therapeutic agents, capable of being introduced into the system by respiration, and the possibility of producing for inhalation vaporizable or volatile preparations of some of our more active and old established medicines: and I have had, during the summer and autumn, ethereal tinctures, &c., of several potent drugs, manufactured for me, for experiment, by Messrs. Duncan, Flockhart, & Co., the excellent chemists and druggists of this city.

Latterly, in order to avoid, if possible, some of the inconveniences and objections pertaining to sulphuric ether, (particularly its disagreeable and very persistent smell, its occasional tendency to irritation of the bronchi during its first inspirations, and the large quantity of it occasionally required to be used, more especially in protractcd cases of labor,)—I have tried upon myself and others the inhalation of different other volatile fluids, with the hope that some one of them might be found to possess the advantages of ether, without its disadvantages. For this purpose, I selected for experiment and have inhaled several chemical liquids of a more fragrant or agreeable odor, such as the chloride of hydro-carbon (or Dutch liquid,) acetone, nitrate of oxide of ethyle (nitric ether,) benzin, the vapor of iodoform, &c.* I have found, however, one infinitely more efficacious than any of the others, viz. chloroform, or the perchloride of formyle, and I am enabled to speak most confidently of its superior anæsthetic properties, having now tried it upon upwards of thirty individuals. The liquid I have used has been

* In talking over, with different chemists, what fluids might be sufficiently volatile to be respirable, and hence deserving of being experimented upon, Mr. Waldie first named to me the perchloride of formyle as worthy, among others, of a trial; Dr. Gregory suggested a trial of the chloride of hydrocarbon, &c. I have been deeply indebted to Dr. Gregory and Dr. Anderson, for their kindness in furnishing me with the requisite chemical agents for these experiments; and also to my assistants, Dr. Keith and Dr. Duncan, for the great and hearty zeal with which they have constantly aided me in conducting the inquiry.

manufactured for me by Mr. Hunter, in the laboratory of Messrs. Duncan, Flockhart & Co.

Chloroform was first discovered and described at nearly the same time by Soubeiran (1831,) and Liebig, (1832;) its composition was first accurately ascertained by the distinguished French chemist, Dumas, in 1835. See the *Annales de Chimie et de Physique*, vols. xlviii, xlix, and lviii. It has been used by some practitioners internally; Guillot prescribed it as an antispasmodic in asthma, exhibiting it in small doses, and diluted 100 times. (See Bouchardat's *Annuaire de Therapeutique* for 1844, p. 35.) But no person, so far as I am aware, has used it by inhalation, or discovered its remarkable anæsthetic properties till the date of my own experiments.

It is a dense, limpid, colorless liquid, readily evaporating, and possessing an agreeable, fragrant, fruit-like odor, and a saccharine pleasant taste.

As an inhaled anæsthetic agent, it possesses over sulphuric ether the following advantages:

1. A greatly less quantity of chloroform than of ether is requisite to produce the anæsthetic effect; usually from a hundred to a hundred and twenty drops of chloroform only being sufficient; and with some patients much less. I have seen a strong person rendered completely insensible by six or seven inspirations of thirty drops of the liquid.

2. Its action is much more rapid and complete, and generally more persistent. I have almost always seen from ten to twenty full inspirations suffice. Hence the time of the surgeon is saved; and that preliminary stage of excitement, which pertains to all narcotizing agents, being curtailed, or indeed practically abolished, the patient has not the same degree of tendency to exhilaration and talking.*

* In practice I have found that any such tendency, even with ether, is avoided by, 1st, giving the patient from the first a large and overwhelming dose of the vapor, and 2ndly, by keeping him perfectly quiet and still, and preventing all noise and talking around him. I have elsewhere insisted on the importance of these points. (See the numbers of the Monthly *Journal of Medical Science* for March, 1847, p. 726, and for September, p.

3. Most of those who know from previous experience the sensations produced by ether inhalation, and who have subsequently breathed the chloroform, have strongly declared the inhalation and influence of chloroform to be far more agreeable and pleasant than those of ether.

4. I believe, that considering the small quantity requisite, as compared with ether, the use of chloroform will be less expensive than that of ether, more especially, as there is every prospect that the means of forming it may be simplified and cheapened.

5. Its perfume is not unpleasant, but the reverse; and the odor of it does not remain, for any length of time, obstinately attached to the clothes of the attendant, or exhaling in a disa-

154.) In the paper last referred to, I took occasion, when discussing the conditions requisite for insuring successful etherization, to observe, "*First*, The patient ought to be left, as far as possible, in a state of absolute quietude and freedom from mental excitement, both during the induction of etherization, and during his recovery from it. All talking and all questioning should be strictly prohibited. In this way any tendency to excitement is eschewed, and the proper effect of the ether inhalation more speedily and certainly induced. And, *Secondly*, with the same view, the primary stage of exhilaration should be entirely avoided, or at least reduced to the shortest possible limit, by impregnating the respired air as fully with the ether vapor as the patient can bear, and by allowing it to pass into the lungs both by the mouth and nostrils, so as rapidly and at once to superinduce its complete and anæsthetic effect; * * * * a very common but certainly a very unpardonable error being to exhibit an imperfect and exciting, instead of a perfect and narcotizing dose of the vapor. Many of the alleged failures and misadventures are doubtless entirely attributable to the neglect of this simple rule; not the principle of etherization, but the mode of putting it in practice being altogether to blame." But, *Thirdly*, whatever means or mode of etherization is adopted, the most important of the conditions required for procuring a satisfactory and successful result from its employment in surgery, consists in obstinately determining to avoid the commencement of the operation itself, and never venturing to apply the knife *until* the patient is under the influence of the ether-vapor, and "*thoroughly and indubitably soporized by it.*" In fulfilling all these indications, the employment of chloroform evidently offers great and decided advantages, in facility and efficieney, over the employment of ether.

greeable form from the lungs of the patient, as so generally happens with sulphuric ether.

6. Being required in much less quantity, it is much more portable and transmissible than sulphuric ether.

7. No special kind of inhaler or instrument is necessary for its exhibition. A little of the liquid diffused upon the interior of a hollow-shaped sponge, or a pocket-handkerchief, or a piece of linen or paper, and held over the mouth and nostrils, so as to be fully inhaled, generally suffices in about a minute or two to produce the desired effect.*

I have not yet had an opportunity of using chloroform in any capital surgical operation, but have exhibited it with perfect success, in tooth-drawing,† opening abscesses, for annulling the

* When used for surgical purposes, perhaps it will be found to be most easily given upon a handkerchief, gathered up into a cup-like form in the hand of the exhibitor, and with the open end of the cup placed over the nose and mouth of the patient. For the first inspiration or two, it should be held at the distance of half an inch or so from the face, and then more and more closely applied to it. To insure a rapid and perfect anæsthetic effect—more especially where the operation is to be severe—one or two teaspoonsful of the chloroform should be at once placed upon the hollow of the handkerchief, and immediately held to the face of the patient. Generally a snoring sleep speedily supervenes; and when it does so, it is a perfect test of the superinduction of complete insensibility. But a patient may be quite anæsthetic without this system supervening.

† A young dentist who has himself had two teeth extracted lately—one under the influence of ether, and the other under the influence of chloroform—writes me the following statement of the results: "About six months ago I had an upper molar tooth extracted whilst under the influenco of ether, by Mr. Imlach. The inhalation was continued for several minutes before I presented the usual appearance of complete etherization; the tooth was then extracted; and, although I did not feel the leat pain, yet I was conscious of the operation being performed, and was quite aware when the crash took place. Some days ago I required another molar extracted on account of tooth-ache, and this operation was again performed by the same gentleman. I inhaled the vapor of chloroform, half a drachm being poured upon a handkerchief for that purpose, and held to my nose and mouth. Insensibility took place in a few seconds; but I was so completely *dead* this time, that I was not in the very slightest degree aware of any thing that took place. The subsequent stupifying effects of the chloroform went off more rapidly than those of the ether; and I was perfectly well and able again for my work in a few minutes."

pain of dysmenorrhœa and of neuralgia, and in two or three cases where I was using deep, and otherwise very painful galvano-puncture for the treatment of ovarian dropsy, &c. I have employed it also in obstetric practice with entire success. The lady to whom it was first exhibited during parturition, had been previously delivered in the country by perforation of the head of the infant, after a labor of three days' duration. In this, her second confinement, pains supervened a fortnight before the full time. Three hours and a-half after they commenced, and, ere the first stage of the labor was completed, I placed her under the influence of the chloroform, by moistening, with half a tea-spoonful of the liquid, a pocket handkerchief, rolled up into a funnel shape, and with the broad or open end of the funnel placed over her mouth and nostrils. In consequence of the evaporation of the fluid, it was once more renewed in about ten or twelve minutes. The child was expelled in about twenty-five minutes after the inhalation was begun. The mother subsequently remained longer soporose than commonly happens after ether. The squalling of the child did not, as usual, rouse her; and some minutes elapsed after the placenta was expelled, and after the child was removed by the nurse into another room, before the patient awoke. She then turned around and observed to me that she had "enjoyed a very comfortable sleep, and indeed required it, as she was so tired,* but would now be more able for the work before her." I evading entering into conversation with her, believing, as I have already stated, that the most complete possible quietude forms one of the principal secrets for the successful employment of either ether or chloroform. In a little time she again remarked that she was afraid her "sleep had stopped the pains." Shortly afterwards, her infant was brought in by the nurse from the adjoining room, and it was a matter of no small difficulty to convince the astonished mother that the labor was entirely

* In consequence of extreme anxiety at the unfortunate result of her previous confinement, she had slept little or none for one or two nights, preceding the commencement of her present accouchement.

over, and that the child presented to her was really her "own living baby."

Perhaps I may be excused from adding, that since publishing on the subject of ether inhalation in midwifery, seven or eight months ago,* and then for the first time directing the attention of the medical profession to its great use and importance in natural and morbid parturition, I have employed it, with few and rare exceptions, in every case of labor that I have attended; and with the most delightful results. And I have no doubt whatever, that some years hence the practice will be general. Obstetricians may oppose it, but I believe our patients themselves will force the use of it upon the profession.† I have never had the pleasure of watching over a series of better and more rapid recoveries; nor once witnessed any disagreeable result follow to either mother or child; whilst I have now seen an immense amount of maternal pain and agony saved by its employment. And I most conscientiously believe that the proud mission of the physician is distinctly twofold—namely, to alleviate human suffering, as well as preserve human life.

Chemical Constitution of Chloroform.

Formyle is the hypothetical radical of formic acid. In the red ant (*Formica rufa*) formic acid was first discovered, and hence its name. Gehlen pointed it out as a peculiar acid; and it was afterwards first artificially prepared by Doebereiner. Chemists have now devised a variety of processes, by which formic acid may be obtained from starch, sugar, and, indeed, most other vegetable substances.

A series of chlorides of formyle are produced when chlorine and the hypochlorites are brought to act on the chloride, oxide,

* See *Monthly Journal of Medical Science* for February, p. 639; for March, p. 718 and 721, and April, p. 794, &c.

† I am told that the London physicians, with two or three exceptions only, have never yet employed ether inhalation in their midwifery practice. Three weeks ago, I was informed in a letter from Professor Montgomery of Dublin, that he believed that in that city, up to that date, it had not been used in a single case of labor.

and hydrated oxide of methyle, (pyroxylic or wood spirit.) In the same way as formic acid may be artificially procured from substances which do not contain formyle ready formed, so also are the chlorides of this radical capable of being procured from substances which do not originally contain it.

Chloroform, chloroformyle, or the perchloride of formyle, may be made and obtained artificially by various processes—as by making milk of lime, or an aqueous solution of caustic alkali act upon chloral—by distilling alcohol, pyroxylic spirit, or acetone, with chloride of lime—by leading a stream of clorine gas into a solution of caustic potass in spirit of wine, &c. The preparation which I have employed, was made according to the formula of Dumas:—

"℞ Chloride of lime in powder, . ℔ iv.
Water, ... ℔ xii.
Rectified spirit, . . . f ℥ xii.

"Mix in a capacious retort or still, and distil as long as a dense liquid, which sinks in the water with which it comes over, is produced."—(Gray's *Supplement to the Pharmacopœia*, 1846, p. 633.)

The resulting perchloride of formyle consists of two atoms of carbon, one of hydrogen, and three of chlorine. Its specific gravity is much greater than that of water, being as high as 1.480. It boils at 141°. The density of its vapor is 4.2. It is not inflammable; nor changed by distillation with potassium, potash, sulphuric, or other acids. (See Turner's *Elements of Chemistry*, 8th edition, p. 1009; Gregory's *Outlines of Chemistry*, part ii. p. 401; Fownes' *Manual of Elementary Chemistry*, p. 419; Thomson's *Chemistry of Organic Bodies*, p. 312; Loewig's *Organische Chemie*, vol. i. p. 498.)

It is now well ascertained that three compound chemical bodies possess, when inhaled into the lungs, the power of superinducing a state of anæsthesia, or insensibility to pain in surgical operations, &c., namely, nitrous oxide, sulphuric ether, and perchloride of formyle. The following tabular view shows that these agents are entirely different from each other in their chemical constitution, and hence that their elementary compo-

sition affords no apparent clue to the explanation of their anæsthetic properties :—

	Propor. of Nitrogen.	Propor. of Oxygen.	Propor. of Carbon.	Propor. of Hydrogen.	Propor. of Chlorine.
Nitrous Oxide,	1 Atom.	1 Atom.	...	...	...
Sulphuric Ether,	...	1 Atom.	4 Atoms.	5 Atoms.	...
Chloroform,	...	..	2 Atoms.	1 Atom.	3 Atoms.

It is perhaps not unworthy of remark, that when Soubeiran, Liebig, and Dumas engaged, a few years back, in those inquiries and experiments by which the formation and composition of chloroform was first discovered, their sole and only object was the investigation of a point in philosophical chemistry. They labored for the pure love and extension of knowledge. They had no idea that the substance to which they called the attention of their chemical brethren could or would be turned to to any *practical* purpose, or that it possessed any physiological or therapeutic effects upon the animal economy. I mention this to show, that the *cui bono* argument against philosophical investigations on the ground that there may be at first no apparent practical benefit to be derived from them, has been amply refuted in this, as it has been in many other instances. For I feel assured, that the use of chloroform will soon entirely supersede the use of ether; and, from the facility and rapidity of its exhibition, it will be employed as an anæsthetic agent in many cases, and under many circumstances, in which ether would never have been had recourse to. Here then we have a substance which, in the first instance, was merely interesting as a matter of scientific curiosity and research, becoming rapidly an object of intense importance, as an agent by which human suffering and agony may be annulled and abolished, under some of the most trying circumstances in which human nature is ever placed.

P. S. Since the above observations were sent to the press, I have—through the great kindness of professor Miller and Dr. Duncan—had an opportunity of trying the effects of the inhalation of chloroform, to-day, in three cases of operation in the Royal Infirmary of Edinburgh. A great collection of professional gentlemen and students witnessed the results, and among the number was professor Dumas of Paris, the chemist who first ascertained and established the chemical composition of chloroform. He happened to be passing through Edinburgh, engaged along with Dr. Milne Edwards, who accompanied him, in an official investigation for the French government—and was, in no small degree, rejoiced to witness the wonderful physiological effects of a substance with whose chemical history his own name was so intimately connected.

I append notes, obligingly furnished to me by professor Miller and Dr. Duncan, of the three cases of operation. The two first cases were operated on by professor Miller; the third by Dr. Duncan. In applying the chloroform in the first case, I used a pocket handkerchief as the inhaling instrument; in the two last I employed a hollow sponge.

Case 1.—"A boy, four or five years old, with necrosis of one of the bones of the fore-arm. Could speak nothing but Gaelic. No means, consequently, of explaining to him what he was required to do. On holding a handkerchief, on which some chloroform had been sprinkled, to his face, he became frightened, and wrestled to be away. He was held gently, however, by Dr. Simpson, and obliged to inhale. After a few inspirations he ceased to cry or move, and fell into a sound snoring sleep. A deep incision was now made down to the diseased bone; and, by the use of the forceps, nearly the whole of the radius, in the state of sequestrum, was extracted. During this operation, and the subsequent examination of the wound by the finger, not the slightest evidence of the suffering of pain was given. He still slept on soundly, and was carried back to his ward in that state. Half an hour afterwards, he was found in bed, like a child newly awakened from a refreshing sleep, with a clear merry eye, and placid expression of countenance, wholly unlike what

is found to obtain after ordinary etherization. On being questioned by a Gaelic interpreter who was found among the students, he stated that he had never felt any pain, and that he felt none now. On being shown his wounded arm, he looked much surprised, but neither cried nor otherwise expressed the slightest alarm."

Case 2.—"A soldier who had an opening in the cheek—the result of exfoliation of the jaw—was next made to inhale. At first he showed some signs of moving his hands too freely; but soon also fell into a state of sleep and snoring. A free incision was made across the lower jaw, and from this the dense adhering integuments were freely dissected all round, so as to raise the soft parts of the cheek. The edges of the opening were then made raw, and the whole line of incision was brought together by several points of suture. This patient had previously undergone two minor operations of a somewhat similar kind; both of them had proved unsuccessful, and he bore them very ill—proving unusually unsteady, and complaining bitterly of severe pain. On the present occasion, he did not wince or moan in the slightest degree; and, on the return of consciousness, said that he had felt nothing. His first act, when apparently about half awake, was suddenly to clutch up the sponge with which the chloroform was used, and readjust it to his mouth, obviously implying that he had found the inhalation from it any thing but a disagreeable duty.

"This case was further interesting as being one of those operations in the region of the mouth, in which it has been deemed impossible to use ether—and, certainly, it would have been impossible to have performed the operation with any complicated inhaling apparatus applied to the mouth of the patient."

Case 3.—"A young man of about twenty-two years of age, having necrosis of the first phalanx of the great toe, and ulceration of the integuments, the consequence of injury. The ulcerated surface was exceedingly tender to the touch—so much so, that he winced whenever the finger was brought near to it; and the slightest pressure made him cry out. After the removal of the dressings, which caused some pain and fretting, the in-

halation was commenced, and the patient almost immediately* became insensible, and lay perfectly still, while the diseased mass was being removed by amputation of the toe through the middle of the second phalanx. The inhalation was now stopped. The edges of the wound were then brought together with three stitches, and the wound dressed. The patient shortly afterwards awoke, looked round him, and gratefully declared his entire and perfect freedom from all pain and uneasiness during the operation."

The whole quantity of chloroform used in these three operations did not exceed half an ounce—and, as professor Miller afterwards observed to the students that were present, if ether had been used, several ounces of it would have been requisite to produce the same amount of anæsthetic effect.

The following case occurred also to-day, to Dr. Miller, in private practice. The notes of it and the subsequent remark are in his own words.

Case 4.—"A young lady wished to have a tumor (encysted) dissected out from beneath the angle of the jaw. The chloroform was used in small quantity (about a drachm,) sprinkled upon a piece of operation sponge. In considerably less than a minute she was sound asleep, sitting easily in a chair, with her eyes shut, and with her ordinary expression of countenance. The tumor was extirpated, and a stitch inserted, without any pain having been either shown or felt. Her sensations, throughout, as she subsequently stated, had been of the most pleasing nature; and her manageableness during the operation was as perfect as if she had been a wax doll or a lay figure.

"No sickness, vomiting, headache, salivation, uneasiness of chest, in any of the cases. Once or twice a tickling cough took place in the first breathings."

I have, up to this date, exhibited the chloroform to about fifty individuals. In not a single instance has the slightest bad result of any kind whatever occurred from its employment.

Edinburgh, *November* 15, 1847.

* Dr. Christison, who was watching the result, informs me that this patient was affected in half a minute.

ARTICLE IV.

Letter from Dr. S. Parsons.

Savannah, Dec. 5th, 1847.

Dear Sir:—In conformity with your request I give the following particulars of a case of galvanic action, and severe pain in the face, caused by two metals in the mouth.

Mrs. A. of a muco-bilious habit, (in good health,) called upon me to have some of her teeth filled. In filling the right superior first molar which was so much decayed in the centre of the grinding surface as to admit readily two sheets No. 6 gold foil, I took a large wedge-shaped plugger and forced it through the centre of the plug, forcing the gold firmly against the walls of the cavity. I then filled up this hole with more gold. Thinking I might get in more metal, I took a smaller wedge-shaped plugger, and forced it in as before, the gold had now become so hard that the point of the instrument broke off in the middle of the plug; it was so firmly imbedded in the gold that to remove it without removing the entire plug was impossible. As she had already become weary of sitting, (having filled a number,) and as she was in haste to return to her family, I closed the gold over the piece of the instrument, giving the plug as good a surface as if no portion of the instrument had remained. I informed her what I had done; expressed some fear that it would not do well, but assured her that I would refill it at any time if necessary. About three days after, her husband informed me that his lady suffered very much from pain on that side of the face; that they had made use of cataplasms, stimulants, &c. to no purpose, and wished to know what could be done. I immediately suggested to him that it was galvanic action, and that the removal of the plug, alone, would afford relief. She accordingly called on me again, I examined her mouth; there was no perceptible swelling of the surrounding parts, and but very little inflammation, yet the pain was severe, and the tooth a little sore to the touch. I removed the

plug, and the pain ceased immediately. Two or three days after the soreness had left the tooth, I refilled it, and it has given no farther trouble.

I will simply add, this occurred in the latter part of August, 1847. Yours, &c.

S. PARSONS.

Dr. C. A. Harris, *Baltimore.*

ARTICLE V.

Letter from Dr. G. F. J. Colburn *of Morristown, N. J.*

Messrs. Editors:

Knowing that the pages of your valuable Journal are ever open to communications tending to promote the welfare of the profession, and for the suppression of quackery in its ranks, I beg leave to call the attention of its readers to the practice of some dentists, of filling teeth with gold and tin-foil, say three-quarters tin to one of gold, the gold being adroitly wrapped around the the tin, so as to present a surface for the purpose of deceiving the patient, making him pay for gold, when it will in time prove worse than nothing.

Within the last few years I have detected so many cases of this species of quackery, emanating in two instances from dentists of high pretensions, that I deem it but justice to the profession to make them acquainted with the fact and consequences. It is evident that two metals, in connection, are readily acted upon by the sceptic acid of the mouth, causing more or less galvanic action, resulting not only in the destruction of the filling, but frequently of the tooth itself; likewise by vitiating the secretions of the mouth, it causes more or less injury to the surrounding parts, while, at the same time, it creates a bad taste and sensation in the mouth.

From the numerous cases that have come under my observation, I will cite one by way of illustration.

Mr. A., a gentleman residing about eight miles from the village in which I am practising, called upon me for the purpose of ascertaining if any thing could be done to remedy a bad taste, and continual flow of saliva in his mouth, which he suspected proceedcd from a tooth which had been filled nearly a year before. Upon examination, I found he referred to the first molar, on the left side of the upper jaw, which had a large cavity upon its grinding surface, in which I found the remains of a filling composed of tin-foil, much oxydized, and a small portion of gold beneath; the gums around the tooth were of a dark color, and quite sensitive to the touch. Although free from tartar, the secretions of his mouth were extremely vitiated.

Mr. A. appeared surprised when I showed him the filling, and told him it was tin and gold, remarking that he paid for gold, and supposed it was, and that he never, knowingly, had a tin filling in his mouth.

Upon examining the cavity, it appeared black as if charred by fire. After removing from it all impurities, I filled it with cotton saturated with spts. of camphor, at the same time scarifying the gums, requesting him if he did not experience a continuance of his complaint to call in a few days and I would fill it with gold, which he accordingly did. Six months afterwards he told me he had had no trouble from the tooth, and that all unpleasant feelings had left his mouth.

In all the cases that have come under my notice, the results appeared to be uniformly the same, namely, the destruction of the filling, and injury to the teeth and gums.

This practice is decidedly pernicious, and cannot be too strongly deprecated.

What should be thought of him, who, in this age of dental science and investigation, gravely practices such abominable deception upon his patients?

How are we to classify these individuals, shall we call them dentists? or, rather quacks and impostors? The teeth are of too much importance to our whole physical organization to be thus tampered with. All operations upon these organs should be

performed not only with the utmost discretion and judgment, but in good faith. At any rate it becomes every honorable practitioner to discountenance and cry out against such mal practice.

G. F. J. COLBURN.

ARTICLE VI.

Physical Diagnosis in Determining the Amount of Muscular Effort Demanded in the Operation for the Extraction of Teeth. By C. O. Cone, D. D. S., Baltimore.

The extraction of teeth is an operation of so frequent an occurrence, and so generally performed without immediately dangerous consequences following, that it has been considered an unlicensed field to labor in, by all that is prompted by a disposition, till this very democratic permission finds a *painful* response, by the strong feelings of dread and reluctance, with which most patients submit to the operation.

To the reflecting dental surgeon, who appreciates the feelings of those who ask his professional assistance, and is emulated with the laudable desire to attain the highest point of professional excellence, will not look upon any thing that may tend to illustrate or explain any feature of this operation with indifference.

The pain necessarily attendant on the removal of a tooth can be greatly abridged, and the certainty of a successful issue much enhanced, by adopting such preparatory measures as the circumstances of the case would seem to demand in securing the desired end. But that there are hundreds in our own profession who never adopt any precautionary measures, or examine the indications connected with the proposed operation, or certain caution to be exercised, but rather trust to the fortunate chance of accident, is a truth that does not demand for its establishment, illustration. And it is equally true, that a large proportion of

such practitoners would gladly avail themselves of the benefits of finger-board-facts in their guidance, if such existed and were tangible. To such, and the *tyro* in the profession, I need not offer any apology for the hints which I am about to propose.

The teeth are held in their respective places in the dental arch by their surrounding alveolar walls, which are accurately adapted to the size and form of the fangs they enclose, and it is to these, aided by the intimate connection existing between the periosteal membrane covering their fangs, together with the length of the latter, and their divergence from parallelism that their firmness is established, although the degree of their firmness is determined by the peculiarities of tissue and structure, or constitutional formation; and that these can be very generally determined by physical indications is unequivocally certain.

To distinguish, and correctly interpret these physical signals with unerring certainty, I am candid to confess is almost impossible, or can only be done with great difficulty, and even then by such only, who have long exercised themselves in this field of physical observation. But to determine whether a tooth demands much or little physical force to remove it from its articulation, is a question more easily determined; and it is a qualification which the dentist should possess in a very general degree; for should he attempt to extract a tooth, without applying sufficient force to the instrument operating upon the tooth, to break up its attachment in the direction corresponding to the motion given by the instrument operating on the tooth, the motion might as well not have been given, so far as the luxation of the organ is concerned in that step of the operation; although it may exhibit the demands required for the next step, which knowledge should have been possessed by the operator, even anterior to his making choice of the instrument for the extraction.

The degree of firmness with which the alveolar processes retain the teeth in their sockets, is determined in a very great measure by the density and unyielding texture of its structure, or, in other words, upon not only the quantity and quality of its mineral ingredients, but, also, upon their molicular and cellular

arrangement, and component quality of its fibrous structural base, and the relative amount of water that is held in its union, together with the thickness of their internal and external plates, and the volume of their transverse uniting laminæ. All of which is dependent on, and regulated by the component parts of the blood. If the red particles of the blood predominates, the osseous parts will be firm and context in structure, and its formation resembling more the compact, than the *areolar texture.*

The periostial tissue lining the cavities in the alveolus for the reception of the fangs of the teeth, and which changes its character in some degree, becoming more adhesive and dense as it ascends about the necks of the last named organs, making their union with the surrounding parts more secure, is dependant also for its firmness and tenacity, together with the surrounding soft tissues upon the condition of the blood, which is determined by the predominance of gelatine over the albuminous particles of this fluid.

Having thus, very briefly, considered the causes that determine the various conditions and degree of firmness of the parts surrounding the teeth, and before proceeding to describe the physical peculiarities marking the various degrees of firmness, of the osseous and fibrous structure in individuals, I would observe, that in all cases, whether the support to the teeth be great or small, their articulation is more firmly established at that period marking the meridian of life, as the chemical composition of the osseous parts, as well as the tenacity of the fibrous tissues varies considerably in the various stages of life, and we may also add, under different circumstances of health and disease. In childhood and youth the relative proportions of animal matter is at its maximum, rendering the bony structure more easily compressed, and the fibrous tissue easily torn, while in advanced age, from the great preponderance of phosphate and carbonate of lime, the osseous tissue is friable and easily fractured, and the fibrous structure rendered brittle.

We find in those individuals who are near a perfect state of health, resulting from good constitutional organization, and where the sanguinous temperament predominates, have all of

you how this happened, as well as for other purposes, it will now be best that I should explain to you the condition of the parts in this malformation, and contrast it in as far as may be requisite with the natural state.

The preparation now before you exhibits the upper part of the mouth and pharynx of an aged female subject. The muscles of the pharynx have been carefully dissected, as have also those connected specially with the palate. A glance at the roof of the mouth shows the gap in the mesial line, and how the uvula, soft palate, and a portion of the hard, are involved in the defect. Behind it may be observed that the constrictors are not so broad, so capacious, as in the natural condition, but that the muscular fibres are nevertheless as strongly developed.

The upper border of the superior constrictor is especially well marked, and here it may be seen to form a kind of semicircular margin, extending between the basilar process of the occipital bone and the internal pterygoid plate, on which margin the levator palati muscle seems to rest. A perpendicular incision has been made through the pharynx behind, exactly in the mesial line, and, the mucous membrane having been stripped off the inside, the muscularity is thus rendered still more distinct. The mucous covering has also been taken off the upper surface of the palate, whereby one side of the nostril immediately above, and the muscles of the palate have been more extensively exposed.

It may now be seen how the two portions of the uvula and corresponding parts of the soft palate touch each other during deglutition, for it is evident that, as the superior constrictor muscles act, they must throw or push the soft tissues in front forwards and inwards; an effect which will be aided by the superior fibres of the middle constrictors, which, stretching across as they do from one side to the other, having no attachment mesially, as is also the case with the lower fibres of the superior muscles, must contribute powerfully to the result in question. A remarkable difference may here be observed between this and the normal state of the parts; the palato-pharyngei muscles are not attached to each other, as in the

well-formed palate. These muscles are seen to form the principal part of the free margin of palate along the line of fissure; their course is somewhat semicircular from their upper end to their lower, the convexity being towards the middle; and it follows that during action, if not opposed in any way, they must pull the parts outwards, an action the reverse of that described by Dzondi, Müller, and others, as belonging to the muscles in their natural condition. The levator palati is seen throughout its entire course, and the tensor palati may also be clearly made out. The levator, it will be perceived, as I imitate its action by pulling it, not only acts very efficiently on the moveable portion of the palate, but its sphere of action, from the muscle being chiefly muscular throughout its entire course, is so great that, during rigid contraction, it must forcibly pull the soft parts upwards, backwards, and outwards. It is worthy of special observation, that the tensor or circumflexus palati has hardly any influence on the velum, for, pull as I choose upon it, there is only the slightest movement to be observed at the parts where its tendon spreads on the surface of the soft palate. Neither in the natural nor in the cleft palate can this muscle have a power at all to compare with the levator, which, from its length, position, and character generally, is the principal motor of this very mobile part. The anterior pillar of the fauces is very slight, and the fibres of the palato-glossus are indistinct; the posterior pillar, however, is distinct enough, and formed as in the natural state by the bundle of fibres of the palato-pharyngeus. The azygos uvulæ is by no means distinct; a bundle of fibres, about the size of a crowquill, may be seen on the lower part of each free margin of the soft palate.

From such an inspection as this preparation afforded, I was led to take those views of the physiology and surgery of the parts, the explanation of which forms the principal object of this lecture. It required no great foresight to perceive that the movement of each side of the palate must depend chiefly upon the action of the levator muscle and palato-pharyngeus. The influence of the levator muscle might have been calculated on from previous knowledge, but that of the palato-pharyngeus

could scarcely have been thought of. Both must evidently have the effect of widening the fissure, especially the levator; and the various conditions under which the palate may be seen can be explained by reference to these two muscles. When the mouth is looked into, and the soft portions of the palate are in a quiescent state, the fissure will then appear probably in a medium state. A slight irritation, with a probe or point of the finger, will cause a corresponding movement—the soft parts will be drawn upwards and outwards, so that the gap will be enlarged. If the irritation be increased, the same parts will be acted on, that they will almost disappear on the sides of the fissure, but even now, if an effort at deglutition be made, the two portions of the uvula will be forced together, by the action of the superior constrictors, as already explained. It seems to me that under ordinary circumstances, after the operation for closing the fissure, the slightest irritation would be likely to call the levators and palato-pharyngei into action, and so induce that dragging on the stitches with which surgeons were so familiar—an influence sufficient, in some instances, to cause ulceration in the seat of the threads, or, in others, to cause separation of the recently-united parts. I therefore supposed that, if these muscles could be divided before bringing the edges of the palate together, the parts would remain so quiet immediately afterwards that there would be greater probability of union in the mesial line taking place than if the muscles were left entire or untouched. It was not long before I had an opportunity of testing the project on the living body. The result was so satisfactory that I tried it in another instance shortly afterwards, and here the effect was most complete. The two cases were appended to my paper on this subject when laid before the Royal Medico-Chirurgical Society, and since that date I have operated on eight more, making ten in all, in eight of which I have been perfectly successful in closing the soft palate. In some of these there has been fissure of the hard palate as well, and the parties have been content with the remaining comparatively small apertures, or have had them closed by obturators. I know of four other instances where the operation, conducted

on the plan recommended by me, has been successful, and a fifth which failed. During the same period I have known three examples of failure by the ordinary method. Thus, out of fifteen cases on my plan, there have been three which did not succeed, while all those done in accordance with Roux's operation were failures.

(To be continued.)

Miscellaneous Notices.

"Foul murder has been done—lo! here's the proof!"—*Old Play.*

Correction.—"Oh for the days of old times of typography, when operatives in the art could render the ancients; when Caxton translated 'Ye Seyge of Troye' from the language of Greece! Would that, in this latter age, when Champollion has deciphered the hieroglyphics of Egypt, when the spirit of inquiry is every where abroad; some one might be found, who could continue to shelter from typical aggression a writer for the press!"

Thus wrote the venerable 'Dr. Ollapod,' while the smarting victim of a proof reader; and thus do we, writhing under the same thorn which called forth the prayer, endorse the apostrophe! We, too, have been victimized; we, too, have been made to endorse sentiments which we never wrote, to call words by wrong names, and to put our signature to unmeaning sentences which scarce bear a semblance to their outraged derivatives in the copy! A "jury of investigation" *might* decide our chirography to be of a character, that it would require another Champollion to decipher it; or they might charge the printer with design, in giving us a voice other than our own! but we will anticipate neither result, and let it be sufficient for us to recount our misfortunes as they are.

We have had the small-pox and the fever and ague, and also a slight touch of the real Asiatic cholera, but we never suffered more than while reading our article for the first time in print, in the October No. of the Journal. If we have an enemy, it would have been greatly to his satisfaction to have been present on the occasion. Had he seen us perspire with rage, while contemplating a distorted sentence, or bite our lips, even to bleeding, with vexation, at seeing the worst possible word in place of the right one, or go into contortions that would do credit to Gabriel Ravell while we discovered some outrageous "*out*" of a line or two in length. If he had not been wholly insatiable, and any ways kind, he would have brushed out the whole score of our offences, and forgiven all of our transgressions!

tition has not been completed, and more frequently found in the first inferior permanent molares, although sometimes in the same class of teeth in the superior jaw. When the second molar in children is about to pass through the gum, or has just cut the same, and from a want of length in the alveolar arch lies slightly oblique, its crown pressing against the posterior approximal surface of the crown of the first molar. In such cases, a good deal of physical force is necessary to be applied to the instrument to remove the tooth above mentioned, although, as I have before intimated, the surrounding parts of the tooth at the age above specified, easily yield, and comparatively demand but a small amount of physical exertion for their removal. We also find a demand for great muscular effort in extracting the first, or second molares of either jaw or side, when their articulation is complete, and the approximal surfaces of their crowns hold each other in position by contact. Such is peculiarly the case in the inferior jaw, when the alveolar border has not lengthened sufficiently, and the *dens sapientiæ* take up a crowded position. We also find that the fangs of the first molar of either jaw, and sometimes the second molar, diverge from the neck of the tooth or its bifurcation, until their extremities describe a circle twice the diameter of the socket at its orifice, and sometimes so tortuous as to encompass or grasp a large piece of the alveolus. These peculiar conformations are more frequently met with in the first permanent molares of the first four classes described, the superior molares more frequently grasping the alveolus, and the fangs of the inferior diverging anteriorly and posteriorly, securing their articulation similar to mechanical dove-tailing.

A tooth or a set of teeth showing great firmness of articulation, may be extracted with little physical force, when its surrounding structure has changed its original character from local or general disease, or when the secreting vessels deposit carbonate and phosphate of lime in too great proportions, as in old age, and render their alveolar walls friable, and the tissues easily broken, or when the osseous and fibrous structure loses its original firmness from an enervated system, and the mineral depo-

sit is deficient, and, at the same time, their molicular arrangement, with its fibrous base is faulty; being dependant on an unhealthy or improperly proportioned state of the circulating fluid, and thus is rendered lax and easily compressible, not possessing its original elasticity and unyielding structure.

ARTICLE VII.

Letter from Dr. S. C. Harbert.

Messrs. Editors:

In the October number of the "Journal," I find over the signature of S. P. Hullihen, an article which, I suppose the author would leave its readers to regard, as a *fair* and *impartial* review of my work on Surgical and Mechanical Dentistry; it is not my purpose in replying to Mr. H. to adopt a tone and character so familiar to him throughout, but "by every *word, deed and action*," to maintain a *consistency* and *truthfulness*, that should belong to every member of the profession.

In the "*review*" alluded to, the writer, after spending his ammunition upon the preface, proceeds to an attack upon the innocent bookbinder, for having placed the plates, "between the index and preface of the book; and then, he attempts an analysis and history of the plates. The figures on plate 1, he says, were copied "from the works of Dr. Paré" and "from a German work, before the time of Paré." This charge is false in every particular, nor do I believe Mr. H. possessed the slightest foundation for such a supposition. If he will refer to page 83 of my work, he will there learn that no merit to originality is claimed in the keys; the excavators as well as the keys, were *selected* from my own case, as considered the most desirable for practical use, the latter (particularly) from their simplicity.

His descriptions of plates 2, 3 and 4, are but as daguerreotypes of the whole, the gums "of brick-dust hue" are as gratuitous, as the "beeswax" his excited imagination has placed upon the plaster cast; while such as afford no possible means for his *deductive* mind, to animadvert upon, is represented as useless, or of "doubtful qualifications."

As to the claims of the profession to the signature of "art" or science. I will not here discuss, though I do not see the applicability of the latter, to the present coherent state of dental practice. Of the fourth page of the "*review*," one half is occupied in quotations, wherein a single error in phraseology, is made to sustain its share, in supporting a criticism, "*fully*, *fairly* and *fearlessly*" executed. Then follows, an error and neglect, which in justice to the Cincinnati College, would have been made in an "errata" in the back part of the book, but to conciliate the printer's views and convenience; other occasional errors were suffered to pass unnoticed from a like cause. The word "Cincinnati" was in the manuscript, with "Philadelpia" interlined, the first was omitted and the latter inserted. Mr. H. is mistaken as to my place of residence; I was obliged from ill health, six years ago, to remove from the city, and have ever since that time, been living sixty miles distant; my distance precluded the possibility of examining every proof sheet, before it went to press. The Philadelphia institution, I was informed by a friend, was designed to be collegiate. On the subsequent page of the review, a passage (in the book) clearly marked as a quotation, is given as original, evidently with the design of creating a false impression with those to whom it may be familiar, and in his remarks upon the "treatment of caries," an attempt is made by placing in juxtaposition, isolated sentences, to prove an inconsistent practice. In conclusion, no man, in putting forth a work upon any subject, can expect to meet with universal favor, nor will a community suffer themselves to be gulled by every garbled statement, that emanates from the caput of any obscure critic, whose sole purpose, would seem by displaying himself before the world, as an able and honest reviewer, to build up his reputation, by the sacrifice of another's.

With the candid of the profession, I leave it to judge, whether the practice, as recommended in my work is erroneous or correct; that I have not been as full as the various subjects will admit of, I have not the presumption to suppose; in the desire to comprehend the leading branches of the practical dentist, in a limited space, much must necessarily be omitted, of service to the accomplished practitioner.

[As Mr. Harbert seems to think that injustice has been done him in the review of his work which appeared in the last number of the Journal, we cheerfully insert the foregoing defence, but we cannot perceive that he has placed his work in a less exeptionable light, or pointed out wherein he had been misrepresented. The mere fact that one of the engravings, of his work represents instruments which he has in his possession, is no proof that Paré's work does not contain engravings of them; equally has he failed to establish the consistency of the doctrine which he has laid down; we cannot see, therefore, that the reviewer has dealt unfairly with him. With Mr. Harbert personally, we know nothing, never having heard his name, to the best of our recollection, until after the publication of his work, and should be very sorry to have him misrepresented through the pages of the Journal, and from the well known reputation of Dr. Hullihen, not only as one of our most scientific and skilful practitioners, but as an honorable highminded man, we feel sure he had no such intention.]—*Balt. Ed.*

ARTICLE VIII.

Letter from Professor SLACK, to JAMES TAYLOR, M. D., D. D. S., Professor of Practical Dentistry and Pharmacy, in the Ohio College, of Dental Surgery, Cincinnati.

DEAR SIR:

I perceive, by the February No. of the "New York Dental Recorder," which you were so good as to allow me to read, that a considerable controversy has been raised in New York, by the action of a dental society, in regard to a quack and most reprehensible method of filling carious teeth with an amalgam of gold or silver, and we presume, more frequently, tin or lead.

I would here remark, that it behoves us, who live far over the mountains, to see that our practice in the only dental school in the west, be regulated by sound principles; let others do as they may.

In an examination of the subject before us, it becomes, in the first place, to attend to a few elementary particulars, which some may call small things, but to my mind, are, at the very foundation of the investigation.

The composition of the tooth, consisting of more than one-third *cellular tissue*, one-half *phosphate of lime*, one-tenth *carbonate of lime*, and a small fraction of fluoride of calcium, is an item to be remembered. The enamel differs from the body of the tooth only in the amount of phosphate of lime, which, on careful decomposition, is found to be 75 per cent.

It is a fact tolerably well decided, that the *silicious coating* of the wheat straw, Indian corn stalk, various grasses—of the cane, ratan, bamboo, &c., is *reticulated*. Also, that the enamel of various oceanic and fluviatile shells possess the same form of structure. The microscope examination of the exterior of a well conditioned tooth leads to the same result, i. e. a smooth reticulated or net work coating.

Secondly. Eremacansis is *slow combustion* or *gradual decay*, and has been ably investigated by Liebig, and confirmed by Dumas Gregory, and all chemists, who endeavor to keep pace with the rapid march of this noble science. This process of decay, slow combustion or oxydation, so important to the *dental practitioner* requires certain conditions to promote it. There must be moisture; a certain temperature above 32°, a blood heat 98°; or even higher, as in hot tea or coffee, or other heated articles of diet. There must be oxygen either from the atmosphere, or some other source, for eremacansis decay, or slow oxydation cannot proceed without this *latter*, which the atmosphere must, in 99 cases out of 100 furnish. Decay, or slow oxydation, then must begin in the external part of the tooth. In the interior oxygen could not be furnished, unless by some potent disease a passage be opened to the atmosphere. Eremacansis is the action of a substance in a state of decompo-

sition, *the particles of which are in intestine motion*—placed in contact with another substance, whose chemical affinities are easily overturned, so as to produce the same change in the latter substance: ego, suppose decaying *matter*, with the circumstance above detailed, be brought in contact with the external of a promising tooth, and continued for some time, what, in the living tooth is likely to be first affected? I have already spoken of the reticulated form of the enamel and of the cellular tissue, which contains nitrogen, and which all chemists admit to be held by the feeblest affinities. The substance in decomposition operates, in my view, first, on the nitrogen of the cellular tissue through the small openings of the enamel, and thus produces the same motion and decomposition in a fraction of the living tooth's tissue. I am aware that sometimes the caries seem to attack the phosphate of lime, while the tissue remains, but careful examination, will, I am persuaded, from the very first, disclose in all such cases, a decidedly unhealthy state in the tissue, though the greatest ravage may appear in the phosphate salt. It is my design to be concise, if practicable; and must thirdly consider the chemical action of substances employed in filling carious teeth on the organ in question, and on the general system. I have no objection to the employment of one metal, such as gold, silver, or platina, if in the state of delicate foil. I will not object to tin foil, if it be pure or free from lead, with which it is, in 9 cases out of 10, adulterated in the tin foil of commerce.

The filling ought always to be with one metal, and only one, to avoid galvanic action, which will result where two metals are employed together. A certain amount of electricity is incident to every substance, whether organic or the contrary, and this is necessary in the organised to a healthy condition; but augment the amount and you invariably have unnatural action, which, if continued, will end in certain, and sometimes, fearful disease.

It may be said there are few metals which produce galvanic action. I deny the position, and my denial is confirmed by the gold plate and solder producing galvanic salivation, as reported in the February No. of the "New York Dental Recorder."

Tin and copper vessels always are oxydizing and corroding, where the solder join the parts furnish a decided effect, produced by small quantities of galvanic electricity The principle of delicate galvanic action is shown in Davy's beautiful contrivance for preserving the copper sheeting of vessels in oceanic waters, by *small substratum* of zinc or iron nails—changing by *induction* the electrical state of the copper. On the same *law* a copper kettle in boiling cider or pickles, is rendered measurably innoxious by immersing in the liquid a piece of pure metallic tin; without the tin it will be most certainly poisonous. The law of induction is illustrated by the practice of packing razors or surgical instruments in zinc cases to prevent rust; the electrical state of the steel instruments is changed to the same with the oxygen of the air; of course, union does not take place —even animal matter, as slices of brain and muscle, and vegetable—as sections of beet root and walnut tree furnish an example of distinct galvanic action where no metal is concerned —but to return to the amalgams noticed above, as used for filling carious teeth. Is it not true that the mercury miners at Idria in Austria, Almeden in Spain, or Guaneavilica in Peru, are frequently affected injuriously by the crude article in which they work? Is it not true that sailors carrying cargoes of metallic mercury are sometimes salivated? These facts show that mercury is easily changed so as to produce the effects noticed; I say changed, for few pure metals are poisonous. Copper, while clean, is inert, but let it be oxydized, i. e. changed, and it becomes poisonous. Lead, when pure, I may affirm, is innoxious, but let it be oxydized, which it must be before combining with carbonic acid, and it is changed; carbonate of lead results, which produces painter's colic, and many other forms of poisoning.

Amalgams are but another name for alloys. In alloys it is a principle that the compound is more changeable than the simples forming the combination. Alloys universally attract oxygen more energetically than the metals of which they are composed. Is not an alloy more inclined to oxydation, i. e. to chemical action, and of course, to galvanic action than its simples?

Does not galvanic action, even in the common battery, primarily result from the oxydation of one metal in the series? Is not this the laws of the battery? Mercury and gold, mercury and silver, mercury and tin, are peculiar combinations or alloys, called amalgams, and these are most strikingly sensible to oxydation, and is not this, of itself, prima facie evidence that galvanic action, to no small extent, results. I speak theoretically, but I have little doubt of the fact, that a few combinations of an amalgam of gold, or silver, or of tin, (I will not mention bismuth or lead) arranged in order, would produce the effects of an imperfect battery. Is it not true, that an amalgam of zinc, tin and mercury (though the tin may be omitted) is considered necessary to the full excitation of the common electrical machine on which the friction of the amalgamed rubber is employed. I admit, with Davy, that the action of this amalgam is unexplained, but I have often thought that possibly the metals combined evolve by friction, galvanic electricity, which is so identical with that of the common glass machines that from this source and the neighboring bodies a large supply of electricity is regularly furnished. This is not more extraordinary than other facts. I have known considerable electricity collected from a piece of dry wood, moved swiftly in a turning lathe, another dry stick being applied to the former, to maintain the friction. Fire is easily produced by such friction. Hence Count Rumford's *wind-fall* of continued friction, producing caloric as long as the motion was kept up, is not so strange after all. In the new hydro-electrical machine, the wonderful evolution of the electrical fluid, from which sparks 20 inches long were drawn by Faraday, he inferred arose from the friction of the steam against the orifices of the tubes from which it was issuing.

The examples of the electrical amalgam, the dyed wood, and the hydro-electrical machine, are introduced to show the wonderful variety and delicacy in electrical action, which no philosopher has satisfactorily explained. Why may not galvanic action be promoted by friction as well as acids? How do we know that an amalgamed rubber *mechanically* pumps up the electri-

cal fluid? The accumulation of the fluid is known, but the why and wherefore we know not. The delicate galvanometer is affected by the movement of the hand on the slightest friction, clearly showing that the electrical or galvanic fluid is present. If a plate of zinc and a plate of copper, each with an insulating handle, be brought together and suddenly separated by a delicate electromiter, the zinc will be found in a positive state and the copper in a negative. Without this expedient they are both said to be positive. Whence the change? It will be answered by *induction*. Then one plate before the contact must have held more of the fluid than the other. May not the simple contact, producing friction, have generated or excited galvanic action? The subject is curious and recondite, but not probed to the bottom. It may be (a supposition) that friction on the amalgamed rubber, the dry wood, or in the hydro-electrical machine, is one means of promoting galvanic action.

The galvanic and electrical fluids are for the most part identical, except in the common machine, the fluid is more dense, in the other more rare, but in larger quantity. They both decompose; they both effect the living subject with as much similarity as their different circumstances and modifications permit. Galvanic action is so variant that it becomes the dentist to look well to its *laws*, if he expect to excel in his profession, or be, as he professes, a benefactor of mankind.

Again, the amalgams so extensively employed in filling carious teeth before employed in such a service, ought to be subjected to the most rigid chemical examination, that the beauty of the face and the general health of the patient may be promoted—if these important points be not reached, the practice ought to be, must be abandoned, as wholly improper. If eremacansis be promoted by the absorption or action of oxygen—a chemical principle well established—I say, theoretically, but, as I believe, truly, the usual amalgam fillings above noticed, must promote decay. And in Dr. Allen's communication referring to the practice, which he seems somewhat to condemn, the fact is abundantly confirmed; and on inquiry, I find a con-

siderable amount of facts, in the west, fully establishing my previous reasonings.

I laid it down above, as a principle somewhat certainly established, that a pure metal, with few exceptions, is innoxious; but one, or especially a compound, easily attracting oxygen, is, in general, deleterious. Will not this remark, based on principles apply most pointedly to the practice in question?

Again: The cellular tissue of the tooth is filled with minute arteries, veins, absorbents and nerves;—leaving out of view galvanic actions—what must be the effect from the oxydation of the inserted amalgam? Will not the deleterious *ide* compound be absorbed? And can a substance certainly poisonous, be any advantage to nerve, artery, veins, blood, &c.? It will be thrown into the circulation, and though the poison may move slowly at first, it will most certainly, unless arrested, perform its work of destruction. Health must be prostrated, and an early grave will be the portion of the victim. Let chemists of experience, or physiologists who understand the chemistry of the system, (which the great Liebig unfolded, and which by others has been most triumphantly confirmed,) speak out, and they will, for the most part, confirm what I have advanced. No other rational conclusion can be drawn from the premises.—*Dental Register.*

ARTICLE IX.

Effects of Camphor on the Teeth.

To the Editor of The London Lancet.

Sir:—The announcement, through the medium of one or two letters in the Lancet, that camphor becomes a destructive agent when applied to the teeth, a theory so totally at variance with the long received opinion, which has induced it to become a very favorite ingredient in tooth-powders, seems, instead of instigating an inquiry into the truth of the assertion, to

have caused a panic among individuals who have the habit of using the same.

That there is a disease which affects the teeth in the peculiar position referred to by Messrs. Tearne and Hunt, that has not yet been satisfactorily accounted for, must have attracted the attention of every individual who has made the diseases of teeth his study; but the assertion, that it is caused by the action of camphor on the teeth is based upon a most egregious error, since precisely the same character of disease is to be found in the mouths of individuals who never (perhaps in the course of their existence) put a brush, much less powder, inside their mouths.

Nor has the camphor, in experiments upon the teeth, the effect that has been asserted; in fact, I can discover not the least perceptible alteration upon the enamel of certain sections of teeth, which I have placed under peculiar experiments since the subject has been noticed in the Lancet. Truly, this may barely be sufficient time as a test, yet I believe that the action of the daily application of the camphor dentifrice for years to be much less than the continued action from a fortnight's immersion in the material. Then, if it is not camphor, the inquiry is suggested—What is it?

It has long been my belief, and under all cases I can (I think) make my argument hold correct, that this peculiar disease originates from an external injury inflicted upon the periosteum of the tooth, in which it originates, produced either from the continual friction of a hard tooth-brush, from the use of metal tooth-picks, or some other hard material injudiciously applied to the teeth; and also may be, and I have no doubt often is produced by the incautiousness of the use of the instruments during the operation of scaling the teeth.

If we just notice which teeth are most commonly afflicted with this disease; moreover, the peculiar position in which it occurs in teeth; I think you will see that it adds force to my opinion, while, at the same time, it equally tends to overthrow that of the camphor theory.

The teeth in which I have most commonly, in practice, no-

ticed the disease, is first, and by far the most numerous, the canines, both upper and lower; secondly, the front upper; thirdly, the bicuspides, both upper and under, as well as the first and second molar: the front under teeth are seldom affected. In the canines, I attribute the more than equal share to liability to accident from their prominent position, and the safety of the front under teeth from the common deposit of tartar which is thrown upon them.

This disease is always upon the outer surface; for upon the palatal and lingual surfaces I do not remember ever having seen it but in one or two cases. Now if camphor were the exciting agent, it would be as liable to act upon the internal as upon the external surface, and more likely than either to act at the interstices, where a deposit of the deleterious matter might take place; but it is not so.

I am further borne out in my own theory by the observation, that in those individuals to whom I have attributed it as originating from the application of a hard brush, I have invariably found that most of the other teeth have, more or less, their fangs denuded of their natural covering, and that the time of life is past maturity; but this is not the case either when the disease takes place in youth, or in the mouths of those adults who do not make use of a tooth-brush; and in these cases it is that I attribute the disease to have originated in an injury upon the periosteum, caused by picking the teeth with pins, tooth-picks, or any hard substance.

The exact position of the tooth in which the disease originates is where the dentine of the tooth approaches nearest to the cortex, the crown being covered by an enamel which ends just where the cortex which covers the fang commences, and both gradually decreasing, unite at this point, where also the periosteum originates; and I presume it is not improbable, that in the mouths of those persons most liable to the disease, the natural cortex is peculiarly deficient.

Consequently, the disease does not progress through a deterioration of the enamel, but arises below, and eats beneath it; and I feel assured that any dentist who ever operated on a tooth

will bear witness to the truth of this statement, that the enamel which is contiguous to this class of disease, is as healthy and perfect as that in the neighborhood of any other species of decay found in teeth that is friable only from want of support, caused by the diseased dentine beneath.

I am, sir, your obedient servant,

C. SPENCER BATE, *Surgeon Dentist.*

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ARTICLE X.

Premature Dentition and Supernumerary Teeth.

To the Editor of The London Lancet.

SIR,—Some time since I was asked by a medical friend to see a female infant, born with two central incisores of the lower jaw, particularly as she suffered from great local irritation. When we called, the child was not very ill, but very fretful; the mouth was hot; there was an extreme secretion and flow of saliva, but the parents objected to the teeth being then extracted. At the end of six weeks from my first visit, the symptoms became more alarming. There was a violent attack of diarrhœa, with indications of a general affection of the mucous membranes of the alimentary canal. The child looked thin, pale, and somewhat emaciated, from constant pain. Having explained that the disturbance was clearly attributable to the continued irritation of the teeth, (which were extraneous bodies,) the mother consented that they should be removed. It was almost marvellous, the improvement in a few days. All the above mentioned symptoms left her, and she acquired plumpness, color, and strength.

Some writers on premature dentition assert that such teeth are generally very defective in their composition; that the dentine is but imperfectly formed; that there is not a vestige of enamel; and that it is very doubtful whether there is any substance analogous to the crusta petrosa. These statements are

generally correct; but in the one mentioned above, the teeth are not only in a normal state, so far as the dentine is concerned, but the whole of the crowns and the fangs are covered with a beautiful, highly polished enamel, very dense, and of a brilliant white color. The fangs of each were perfectly formed, being of the usual length of such, and similar to those which make their appearance at the ordinary period.

It would appear that the vital energy of the vascular nervous pulps of these kind of teeth is so vigorous, as to cause their formation and rapid development: but, as if from this very circumstance, the vitality of the nervo-sanguineous pulp, with its secreting powers, seems to be by such means exhausted; for it is rarely that such premature teeth are completely formed. The two I have just described are the most perfect of any in my possession, yet they are not tapered to a point. In each tooth the pulp could be seen (by means of a microscope) somewhat contracted, and somewhat tapering, but still within the bony cavity; so that from being thus within the bony envelope, they became, to all intents and purposes, merely extraneous bodies.

My infantile patient was healthy and well formed, with black hair on her head at her birth, in a rather larger quantity than is usually the case. Her parents were healthy, and about thirty years old. They had married early, and had many other children, whose teeth were not developed before the usual period.

Some of our dramatists have attributed evil tendencies to children who are born with "teeth," but my little patient was subsequently amiable and tractable. Nor could I find any solution from any preternatural growth of other organs, having particularly examined the osseous structure, but without detecting any marked difference when compared with other infants of a similar age.

Supernumerary Teeth.—I would also call your attention to another curious fact in the dental system—the formation of supernumerary teeth, which can only be regarded as a connate variety, similar to the occasional development of six fingers and six toes.

Supernumerary teeth are found of various shapes: some coni-

cal, some pear-shaped, some resembling other teeth, with some modification of structure. They are usually formed between the central incisores, or between the lateral incisores, and in some instances in the palatine bones. There is one great peculiarity—they have usually a greater thickness of enamel than any other teeth in the same mouth. In some instances they are connected with the posterior or the lateral surfaces of incisor teeth, and appear as offshoots of one of the tooth pulps. I recollect one instance where the supernumerary tooth connected the two central incisores. In the numerous instances in which I have extracted them, I do not remember more than one exception in which they have been found before the development of the second or permanent teeth. Lately, I removed one from a young lady of a delicate form, with a nervous temperament, the shape of which resembled a lateral incisor, very thickly coated with enamel, particularly on its posterior surface, in which that substance was in thick masses, and ribbed. There could not be any difficulty as to its being a supernumerary tooth, as there were two large central incisores, (one forced in an oblique direction,) with two beautifully formed lateral incisores on each side; the cuspidati, bicuspides, and molares, being of the usual number and character.

I am, sir, yours, respectfully,

J. L. LEVISON.

Quackery, is the tail end of progression, and bears the same relation to civilization that the goose does to the giblets—sensible men swallow the former, whilst the latter is the dish of ignorant menials and satraps.—GIDEON HARVEY.

ARTICLE XI.

On Cleft Palate, and on Staphyloraphy. By WILLIAM FERGUSSON, Esq., F. R. S. E., Professor of Surgery in King's College London.

From the Medical Times.

Author's experience increased since the reading of his paper on these subjects in 1844, *before the Medical and Chirurgical Society of London; nature of cleft palate; different forms and kinds of; its complication with hare-lip; effects of malformation on deglutition and on voice and speech; method of obviating defects before modern operation of staphyloraphy; advantages and disadvantages of latter proceeding; indifferent success of the operation, although performed by most of the leading surgeons in Europe and America; success of Roux, Mütter, and Dr. J. M. Warren; apathy of British surgeons on the subject; author's investigations; anatomy and physiology of cleft palate first described by him; new operation proposed and performed by author, and its success in various instances; reviews of different proposals, by Roux, Bushe, Dieffenbach, Pancoast, Liston, Mittauer, and J. M. Warren; fit cases for operation; age proper for its performance; author's operation described; ligatures and knots; new knot; after treatment; causes of failure of operation; examples of success of author's plan; effects of operation on voice and speech, &c.*

Two years have now elapsed since I delivered a special lecture on these subjects, and about the same time I communicated a paper to the Royal Medical and Chirurgical Society, which was afterwards honored with a place in the volume of "Transactions" for the year 1845. During the interval my experience has accumulated, and I am now desirous of stating the results, while, at the same time, I bring before my pupils as much upon such topics as pertains to the duties of the chair which I occupy in this college.

The state of the mouth, familiarly known under the name of cleft palate, is congenital, although a condition somewhat analogous to it occasionally results from injury or disease. It is chiefly to the natural malformation that the following observations apply, although they are suitable in many respects to other imperfections in the palate and roof of the mouth generally. The congenital defect is met with in a variety of forms: in some instances the fissure is limited to the uvula, when that part appears double; in others the fissure extends further forward, so as to leave the velum in two halves; the whole, or a portion only of this part, may be thus; the fissure may extend partially or entirely through the hard palate; the alveolar ridge may also be implicated, in which case the condition is usually, if not always, accompanied with fissure in the upper lip as well. The hare-lip and cleft palate very frequently go together, although it is by no means unusual to see either the one or the other by itself. The fissure in the uvula and soft palate is invariably in the mesial line; even in the hard palate it appears to be so, although commonly the vomer is attached below, directly in the middle, and the fissure communicates with one nostril only. When the alveoli are divided also, the fissure is always to the side, and this is particularly conspicuous when there is a double hare-lip present at the same time. There is, then, an intermaxillary bone immediately underneath the columna, on which rests the middle portion of the upper lip. Sometimes the fissure appears as a narrow slit, and in other instances is so wide and large as to cause the mouth and nostril to appear like one huge cavity.

The effects of cleft palate are observable in various ways. In infancy, if the malformation be at all extensive, there may be imperfect nourishment in consequence of part of the food passing into the nostrils during deglutition; and in advanced years the peculiar tone of voice and defective pronunciation are remarkably characteristic of this condition. Infants sometimes die from inanition in this state; and in the adult the deficiencies alluded to are often such as to mar his prospects in life. The tone of the voice often gives rise to unjust suspicions

against the sufferer, and there are many so conscious of the unpleasant sound that they use it as little as possible.

Until the present century, the means known for obviating the defects alluded to were of a very imperfect kind. In the adult, the opening could be closed only by an obturator or false palate; and in the child, even now, we know of no other remedy for the defect than a spoon or bottle, with some contrivance attached to it whereby the food is passed almost into the pharynx at once. In modern times, however, something more has been done for the adult; and it has been proposed to treat the fissure in the palate on the same principles as have long guided us in cases of hare-lip. Roux and Graefe in Europe, and Warren in America, pared the edges of the cleft, and brought them into contact in such a manner as to permit union by the first intention; and so the malformation was soon remedied, as in the more familiar example of hare-lip.

The intention with which an obturator or false palate is applied is, that, by closing the direct communication between the mouth and nostrils, the sound of the voice may pass outwards through the mouth without the nasal accompaniment which gives its unpleasant character. It is also used to prevent the escape of food upwards: for although the adult, by long custom and constant care, can generally swallow all his food and drink, yet in an unguarded moment, a lapse may occur, and cause much annoyance. The objects of the operation being the same as those just alluded to, it will be very apparent that, if the two sides of the palate can be brought together to have the same effects as the obturator, the advantages are great in favor of such a proceeding. If the operation be successful the parts are put in a condition similar in most respects, to their natural state, as if no such malformation had ever been present. As regards the voice and articulation, this was remarkably evinced in the case of the first patient on whom Roux operated. When the gentleman, a student of medicine, returned among his former friends, there was such a change for the better that he could not have been recognised by his speech alone.

Notwithstanding the apparent merits of the surgical operation for cleft palate (staphyloraphy, as it is called,) there are certain disadvantages connected with it which should always be borne in mind when an opinion is required on the propriety of performing an operation, or the probability of its results. Even with the utmost care the proceeding when done may end in partial or complete failure, there may be some portion of the fissure, perhaps in the hard palate, which may baffle the surgeon's skill; or, from causes over which he has no control, the union of the soft parts, which it is his object to effect, may not occur. Even under the most favorable circumstances, as regards union, the patient's speech may not be so much improved as had been anticipated. Then there are difficulties connected with the operation so vexatious, so trying to the surgeon's patience, as well as to the endurance of the patient himself, that it must always be looked upon as one of the most harassing that we are ever called upon to perform. The slightest opposition on the part of the patient may prevent the operation being performed; and a trifling indiscretion, in not attending to the injunctions of the surgeon afterwards, may mar the effect of the proceeding, however successfully it may have been accomplished at the time. All these circumstances, as observed in different cases, have, no doubt, had effect on the surgeon's mind, and as the successful results have not been commensurate with the seeming disadvantages have rendered him somewhat careless regarding the proceeding.

The operation has, nevertheless, been done by most of the leading surgeons of the day, among whom may be mentioned Roux, Graefe, the Warrens, father and son; Dieffenbach, Brodie, Guthrie, Liston, Bushe, Cusack, Crampton, Mittauer (of Virginia,) Mütter and Pancoast (of Philadelphia,) &c. In 1842 it was said that Roux had performed it upwards of one hundred times. In two-thirds of the simple cases, and in one-third of those which were complicated, the proceeding had been beneficial. In 1843, my friend Dr. Mütter had operated twenty-one times upon the soft and hard palate, and out of this number "had failed to relieve the patient but in two cases;"

and Dr. J. Mason Warren had been equally successful in thirteen out of fourteen instances, in which he had operated. Indeed the success of these gentlemen had seemingly been greater than that of the distinguished author of the operation—Roux, although it would be observed that the cases were far fewer in number than had been treated by that surgeon. Few though they are, however, comparatively, I do not suppose that any surgeon in this country has operated on so many; no statistics have been drawn; no one has had the courage to publish an account of his cases; and a general impression has prevailed that the proceeding has been very unsatisfactory. Among the various cases that had come under my own notice, until within a comparatively recent date, the constant failures had been such as to induce great apathy on my part towards the proceeding, an apathy which had been somewhat increased by the failure of an operation performed on a gentleman in London, by Roux himself, when here on a visit a few years ago; and also by a similar result following an operation done by Mr. Bowman, in whose hands the proceeding had received every justice. I mention the latter case thus pointedly, because I shall have to draw attention to it again in a future part of this lecture.

I had not, however, given up all interest in cases of this malformation, and certain circumstances induced me, about three years ago, to bestow more attention and study on the subject than I had done previously. A preparation of cleft palate in my possession gave me an opportunity of investigating the anatomy, and this led me to draw certain conclusions regarding the physiology and surgery of these parts, such as I believe had never been made before.

It had long been familiar to those accustomed to see such cases on the living body, that during deglutition the two portions of the uvula came together in the middle line; but no one had attempted to explain how this could happen, and even such an acute observer as M. Malgaigne stated, that it was "by a muscular action, of which it is difficult to give an explanation." The dissection of the parts enabled me to explain this in a way which I imagine is incontrovertible; and to show

you how this happened, as well as for other purposes, it will now be best that I should explain to you the condition of the parts in this malformation, and contrast it in as far as may be requisite with the natural state.

The preparation now before you exhibits the upper part of the mouth and pharynx of an aged female subject. The muscles of the pharynx have been carefully dissected, as have also those connected specially with the palate. A glance at the roof of the mouth shows the gap in the mesial line, and how the uvula, soft palate, and a portion of the hard, are involved in the defect. Behind it may be observed that the constrictors are not so broad, so capacious, as in the natural condition, but that the muscular fibres are nevertheless as strongly developed.

The upper border of the superior constrictor is especially well marked, and here it may be seen to form a kind of semicircular margin, extending between the basilar process of the occipital bone and the internal pterygoid plate, on which margin the levator palati muscle seems to rest. A perpendicular incision has been made through the pharynx behind, exactly in the mesial line, and, the mucous membrane having been stripped off the inside, the muscularity is thus rendered still more distinct. The mucous covering has also been taken off the upper surface of the palate, whereby one side of the nostril immediately above, and the muscles of the palate have been more extensively exposed.

It may now be seen how the two portions of the uvula and corresponding parts of the soft palate touch each other during deglutition, for it is evident that, as the superior constrictor muscles act, they must throw or push the soft tissues in front forwards and inwards; an effect which will be aided by the superior fibres of the middle constrictors, which, stretching across as they do from one side to the other, having no attachment mesially, as is also the case with the lower fibres of the superior muscles, must contribute powerfully to the result in question. A remarkable difference may here be observed between this and the normal state of the parts; the palato-pharyngei muscles are not attached to each other, as in the

well-formed palate. These muscles are seen to form the principal part of the free margin of palate along the line of fissure; their course is somewhat semicircular from their upper end to their lower, the convexity being towards the middle; and it follows that during action, if not opposed in any way, they must pull the parts outwards, an action the reverse of that described by Dzondi, Müller, and others, as belonging to the muscles in their natural condition. The levator palati is seen throughout its entire course, and the tensor palati may also be clearly made out. The levator, it will be perceived, as I imitate its action by pulling it, not only acts very efficiently on the moveable portion of the palate, but its sphere of action, from the muscle being chiefly muscular throughout its entire course, is so great that, during rigid contraction, it must forcibly pull the soft parts upwards, backwards, and outwards. It is worthy of special observation, that the tensor or circumflexus palati has hardly any influence on the velum, for, pull as I choose upon it, there is only the slightest movement to be observed at the parts where its tendon spreads on the surface of the soft palate. Neither in the natural nor in the cleft palate can this muscle have a power at all to compare with the levator, which, from its length, position, and character generally, is the principal motor of this very mobile part. The anterior pillar of the fauces is very slight, and the fibres of the palato-glossus are indistinct; the posterior pillar, however, is distinct enough, and formed as in the natural state by the bundle of fibres of the palato-pharyngeus. The azygos uvulæ is by no means distinct; a bundle of fibres, about the size of a crowquill, may be seen on the lower part of each free margin of the soft palate.

From such an inspection as this preparation afforded, I was led to take those views of the physiology and surgery of the parts, the explanation of which forms the principal object of this lecture. It required no great foresight to perceive that the movement of each side of the palate must depend chiefly upon the action of the levator muscle and palato-pharyngeus. The influence of the levator muscle might have been calculated on from previous knowledge, but that of the palato-pharyngeus

could scarcely have been thought of. Both must evidently have the effect of widening the fissure, especially the levator; and the various conditions under which the palate may be seen can be explained by reference to these two muscles. When the mouth is looked into, and the soft portions of the palate are in a quiescent state, the fissure will then appear probably in a medium state. A slight irritation, with a probe or point of the finger, will cause a corresponding movement—the soft parts will be drawn upwards and outwards, so that the gap will be enlarged. If the irritation be increased, the same parts will be acted on, that they will almost disappear on the sides of the fissure, but even now, if an effort at deglutition be made, the two portions of the uvula will be forced together, by the action of the superior constrictors, as already explained. It seems to me that under ordinary circumstances, after the operation for closing the fissure, the slightest irritation would be likely to call the levators and palato-pharyngei into action, and so induce that dragging on the stitches with which surgeons were so familiar—an influence sufficient, in some instances, to cause ulceration in the seat of the threads, or, in others, to cause separation of the recently-united parts. I therefore supposed that, if these muscles could be divided before bringing the edges of the palate together, the parts would remain so quiet immediately afterwards that there would be greater probability of union in the mesial line taking place than if the muscles were left entire or untouched. It was not long before I had an opportunity of testing the project on the living body. The result was so satisfactory that I tried it in another instance shortly afterwards, and here the effect was most complete. The two cases were appended to my paper on this subject when laid before the Royal Medico-Chirurgical Society, and since that date I have operated on eight more, making ten in all, in eight of which I have been perfectly successful in closing the soft palate. In some of these there has been fissure of the hard palate as well, and the parties have been content with the remaining comparatively small apertures, or have had them closed by obturators. I know of four other instances where the operation, conducted

on the plan recommended by me, has been successful, and a fifth which failed. During the same period I have known three examples of failure by the ordinary method. Thus, out of fifteen cases on my plan, there have been three which did not succeed, while all those done in accordance with Roux's operation were failures.

(To be continued.)

Miscellaneous Notices.

"Foul murder has been done—lo! here's the proof!"—*Old Play.*

Correction.—"Oh for the days of old times of typography, when operatives in the art could render the ancients; when Caxton translated 'Ye Seyge of Troye' from the language of Greece! Would that, in this latter age, when Champollion has deciphered the hieroglyphics of Egypt, when the spirit of inquiry is every where abroad; some one might be found, who could continue to shelter from typical aggression a writer for the press!"

Thus wrote the venerable 'Dr. Ollapod,' while the smarting victim of a proof reader; and thus do we, writhing under the same thorn which called forth the prayer, endorse the apostrophe! We, too, have been victimized; we, too, have been made to endorse sentiments which we never wrote, to call words by wrong names, and to put our signature to unmeaning sentences which scarce bear a semblance to their outraged derivatives in the copy! A "jury of investigation" *might* decide our chirography to be of a character, that it would require another Champollion to decipher it; or they might charge the printer with design, in giving us a voice other than our own! but we will anticipate neither result, and let it be sufficient for us to recount our misfortunes as they are.

We have had the small-pox and the fever and ague, and also a slight touch of the real Asiatic cholera, but we never suffered more than while reading our article for the first time in print, in the October No. of the Journal. If we have an enemy, it would have been greatly to his satisfaction to have been present on the occasion. Had he seen us perspire with rage, while contemplating a distorted sentence, or bite our lips, even to bleeding, with vexation, at seeing the worst possible word in place of the right one, or go into contortions that would do credit to Gabriel Ravell while we discovered some outrageous "*out*" of a line or two in length. If he had not been wholly insatiable, and any ways kind, he would have brushed out the whole score of our offences, and forgiven all of our transgressions!

The first particular spasm we experienced occurred just as our eyes fell upon the word *resuscitation*, on the 79th page, in place of *vesication*, as we thought we wrote it. "*Blister* the printer," said we "how fortunate for him that mountains and rivers are between us!" Although vesication is sometimes resorted to to produce resuscitation, yet we apprehend there is a slight difference in their signification—at least were every nervous twinge we experienced during the *reading*, a blow at the printer, he would have presented a *scarcely* living specimen of vesication, and in great need of resuscitation, even at the expense of the villanous ether which *he* advocates for this purpose!

"*Stentorious*" in place of *Stertrous*, on the opposite page, gave us no new feelings of delight, and we really began to blame Dr. Webster that he had not taught *every one* the difference between apoplectic breathing and *thunder!* Yet onward we went, fearing at every step, wading through comma-less sentences of such length that we were obliged to hold our breath as long as a pearl-diver to read them; blaming, forgiving, exonerating the printer, and, finally, anathematizing ourselves and bad writing, until we found ourselves at the bottom of the 85th page; and here *was* an opportunity for charity to have full scope; although we had shouldered everything else, we could not though we would, be of any service here. Here, in horticultural parlance, was a kind of "shortening-in" process that would be an example to a professed gardener—may we produce the better fruit for it the coming season! Here, was actually an "*out*" of a whole line or more, which was certainly in the copy. Had it occurred at any other place in the article, it would have been of less consequence, but here, where we wished to be particularly emphatic, the error comes more than ever, *out of place.* But we will not enlarge upon a subject so disagreeable, and promise the printer that if he will forgive all of our hard thoughts, we will endeavor to write a better hand hereafter.

With this No. we "drop a line" to each of our subscribers. By pasting it at the bottom of the 85th page, and also by drawing a pencil across and correcting the two other errors referred to, they will do us a favor which we promise never to ask again.—*Cazenovia Ed.*

[Our colleague has certainly some cause of complaint, but the deciphering of the manuscript of the article in question was as troublesome to the compositor and proof-reader, as the typographical errors which occurred in the printing has been annoying to him.—*Balt. Ed.*]

Chloroform, a New Anæsthetic Agent.—As the readers of the Journal are all aware, the idea of preventing pain in surgical operations, by the inhalation of a volatile agent, originated with, or rather, its practicability was first fully demonstrated by Dr. Morton of Boston, and the substitu-

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tion by another of any less objectionable and more efficient agent, than that which he employed, will not, in the least, dim the glory which he has won by the discovery, nor pluck a single leaf from the laurels which he has richly earned, should it ultimately prove to be as valuable as it is at present thought to be, by many eminent surgeons both in Europe and America.

For so simple an operation as the extraction of a tooth we have never been a very warm advocate for the inhalation of the vapor of sulphuric ether, the anæsthetic agent hitherto employed, for the purpose of producing insensibility. The injurious effects liable to result from it, as well as its disagreeable and offensive odor, have constituted with us very serious objections to its use in so simple an operation. These objections, however, have been removed by Professor Simpson of Edinburgh, in the substitution of chloroform, or the perchloride of formyle for ether, which he has found by experiment to be a more powerful anæsthetic agent. A very interesting paper on its properties and effects, read by Professor S. before the Medico-Chirurgical Society of Edinburgh, on the tenth of Nov. 1847, will be found in another part of the present number of the Journal, and for this early opportunity of laying it before our readers, we are indebted to Mr. Spence, an eminent dentist of that place, who sent it to us on the day of its publication. In a note accompanying the pamphlet, Mr. Spence speaks of it as being likely altogether to supersede the use of ether, as "it is more easily administered, more rapid in its effects, more agreeable to the patient and more certain in producing the anæsthetic effect."

We have as yet had an opportunity of administering it to only a few, and, therefore, are not prepared to express our opinion upon the subject as fully as we may hereafter be able to do, after we shall have more thoroughly tested its effects. Thus far, we have exercised much caution in administering it, but from the few experiments which we have made, we are inclined to believe that it is far superior to ether. It is certainly more pleasant to the patient—the odor of it not being in the least disagreeable, and it is more efficient and rapid in producing the anæsthetic effect. So far as our own observations go upon the subject none other than the most delightful sensations are produced by its inhalation, and it leaves no disagreeable effects about the head, nausea, or other unpleasant symptoms. The inhalation of ether, at first excites the action of the heart and arteries, and accelerates the pulse, the anæsthetic, seeming to be a secondary effect. Chloroform does not, or at any rate, in so manifest a degree; it apparently produces an immediate sedative effect without materially increasing the frequency of the pulse.

We have been assisted, in all the experiments which we have made with the chloroform, by Professor T. E. and Dr. J. Bond. The last named gentleman has given us the following brief statement of the results.

"The first person to whom it was administered, was Mr. A., a student of dentistry, who had frequently been under the influence of sulphuric ether, and inhaled the chloroform for the purpose of comparing the effect of the latter with the former. He did not desire an operation. The effect upon this gentleman was decisive of the virtue of the agent in the production of total insensibility. After inhaling the vapor for forty seconds, he became totally unconscious, in which state he remained sufficiently long to have had a tooth extracted. Mr. A. decidedly prefers the chloroform to the ether as being more pleasant to inhale, more speedy in its effects, and leaving no unpleasant sensation after the restoration of consciousness. The next subject was a gentleman who had also been under the influence of sulphuric ether a number of times. In this case the chloroform was inhaled for one minute, when it produced total insensibility. While under the influence of the agent a lower bicuspis was extracted without the slightest pain to the patient. I would mention that in order to extract the tooth, the operator, Dr. Cone, was obliged to cut away the alveolar process surrounding it; thus rendering the operation more tedious than usual, and affording a better test. Several other persons submitted themselves to the experiment without testing the effect by an operation, but some of them might have undergone similar operations without suffering any pain. One gentleman complained afterwards of a slight tinnitus aurium, which passed off in a few minutes. The next person who took it had two upper molares extracted by Dr. Noyes, which were so firmly adherent to their alveoli, that a considerable portion of the sockets came away with the teeth. From the extraction of the first tooth the patient suffered no uneasiness, though he afterwards said he was mentally conscious of the operation. During the extraction of the second he was in a profound snoring sleep, which lasted some seconds after the operation. The same patient has since had two more extracted; but the effect before the removal of one had nearly passed off before the operation was performed, consequently it caused some pain. In all these cases the vapor was administered by means of Dr. Roper's inhaler. The effect of the chloroform appears to be directly sedative, and productive of no unpleasant effect upon the brain."

Since writing the above, the same patient has had three lower molar teeth extracted, while under its influence, without suffering any pain.

For the early opportunity we have had of testing the effects of chloroform, we are indebted to Dr. Andrews of Baltimore, one of our most scientific and best practical chemists, who immediately on application, prepared it for us.

In conclusion, we do not wish to be understood as recommending the use of even chloroform in so simple an operation as the extraction of a tooth. We have not yet witnessed enough of its effects to assure ourself that it is perfectly safe. We shall, however, keep our readers advised

of the results of such experiments as may be made with, as shall come to our knowledge.

Since the above was written, the Baltimore American has copied from a late Liverdool paper, the following report of surgical operations performed upon individuals while under the anæsthetic influence of chloroform.—*Balt. Ed.*

The New Agent for producing insensibility of pain.—In pursuance of an invitation given by Hugh Neill, Esq., the surgeon of the Eye and Ear Infirmary in this town, several gentlemen, eminent in the medical profession, attended on Tuesday last, at the Ophthalmic Institution, to witness some operations for squinting, upon patients while under the influence of "chloroform," a new agent, said to produce complete unconsciousness, more easily and more efficiently than sulphuric ether. The new agent is very pleasant to the palate, and yields a delightful perfume, not much unlike that of a ripe apple, or good sherry wine. Its inhalation produces the most delightful sensations, and, in the course of a minute or so, a state of the soundest somnambulism. Sulphuric ether, on the contrary, is very disagreeble both to the palate and the olfactory nerves, and is much longer in producing the required result. It also produces great nausea, and has not always been administered without acting for a time somewhat injuriously upon the nervous system.

Among the medical gentlemen present at the Ophthalmic Institution, on Tuesday, were Dr. Formby, Dr. Sutherland, the talented editor of The Health of Town's Journal; Dr. Imlach, Mr. Waldie, Mr. Higginson, Mr. Bickersteth, Dr. Hunter Robinson, of Birkenhead, author of a pamphlet on the sanitary state of that township; and many gentlemen connected with the hospitals and dispensaries of Liverpool.

Mr. Neil, previous to operating upon either of the patients, gave a short history of the discovery of ether as an agent to produce insensibility to pain, and, lastly, of "chloroform," as a more pleasant and satisfactory substitute. In the course of his remarks he noticed curious facts of the chloric ether having been first used, and recommended to Professor Simpson by Dr. Formby, and chloroform having been also recommended to the same gentlemen by Mr. Waldie, chemist of the Liverpool Apothecaries' Company, who pointed out to the professor the advantages to be derived from its use.

The patients selected on this occasion were four young females, the only blemish to whose round and handsome faces was that they had each rather more than "an interesting cast of the eye"—in fact that they squinted very badly. The operation whereby this affliction can be totally remedied is necessarily a painful one, though happily one of very short duration, or it would, perhaps, be unbearable by any person acted upon in the natural state.

The chloroform was administered in the three first cases, through the medium of a handkerchief, held up to the nasal organ and mouth, and, as insensibility was produced, the patients were operated upon by Mr. Neill, in the most successful manner; but the fourth case furnished a triumphant instance of the power of the new agent, not perhaps that the other cases would not have been equal to it if the assistants had been used to their work. With the experience furnished by them, the requisites necessary to a most complete administration of the chloroform, by means of the sponge, were systematically and noiselessly executed, and the patient was speedily thrown into a state of complete unconsciousness. During

the inhalation of the vapor through the sponge, which of course allows a free passage to the atmospheric air, her countenance wore a most pleasurable expression; nor did it alter in the least during the trying moments of the operation. She remained in a sound slumber for several moments afterwards and did not evince the slightest sensation of feeling when repeatedly pinched by many of the gentlemen present. In this case, the eye was turned so completely inwards, that greater force with the forceps was required, and had the patient been operated upon in her natural state, the pain would have been proportionably excruciating. Upon waking to consciousness in about a quarter of an hour, she said she was not aware that anything at all had been done to her. The medical gentlemen present thought this case furnished a most excellent test of the efficacy of the new agent, and a vote of thanks was unanimously passed to Mr. Neill by the gentlemen present, for the opportunity he had afforded them of witnessing these interesting experiments.

All the four patients were thus completely cured of obliquity of vision, and being out-patients, were enabled to walk to their respective homes in an hour or two after the operation had been performed. Upon inquiry, in the couse of the afternoon, Mr. Neill found them all in excellent health, and thankful for the service that had been rendered to them.

Experiments with Chloroform.—Several important and most painful operations were performed on Thursday, at the Workhouse Hospital, by Dr. F. H. Brett, in the presence of the staff, and other gentlemen, when the new agent for producing insensibility was administered with entire success in the following cases.

The first was the case of Elizabeth Birch, aged 22, affected for years with inversion of the eyelids (entropion) causing inflammation of the eye by the constant irritation of the lashes against the globe. It was necessary to make perpendicular incision at the outer angle of the lids, and to excise a portion of the skin of the upper eyelid, to introduce a suture, and partially to evert the lid by means of a ligature passed through the margin of the lid, this last being secured on the forehead by strips of adhesive plaster. The patient was in a state of perfect insensibility the whole of the time.

The second was a case of strabismus.

The third a hydrocele, which after tapping, was followed by injection of the sack, with a solution of iodine.

The fourth operation was for cataract, which being of a soft nature, the drilling method through the cornea by means of a delicate needle, was selected, the fluid portion of the soft lenticular body being freely exposed to solution in the aqueous humor.

The fifth case was that of dividing the tendons behind the knee-joint (the ham strings) in both legs of Bridget Mackle. The woman had been a cripple for three years, bent double, and bed-ridden—the legs are now straight, and are to be kept on splints for a short time.

The sixth case was that of a young woman, named Elizabeth Felliwell, who had been discharged from the hospital as incurable, from recto-vaginal communication, complicated with several tumors deeply situated. The parts being freely exposed by the speculum, a clean wound was made of the former and the morbid growth completely extirpated. No operation could well be conceived more painful than this under ordinary circumstances, yet the poor girl was taken to her bed, in a perfect trance, and was quite unconscious of any part of the operation.

The 7th case was precisely of a similar nature in a young woman na-

med Ann M'Ney. She had been much debilitated, but under remedies to improve her constitutional power, nourishing diet and wine, she was sufficiently restored in health to undergo the operation. The chloroform, however, happily saved her from any knowledge of the operation. She awoke complaining bitterly that she was not to undergo the operation which she had been so long promised was to relieve her from a complaint, the most distressing to which a female can be subjected, until she was assured that all was over.

The eighth, and last, was a case of scrofulous disease of the knee-joint, in which it was necessary to remove the limb in a girl, aged six years. This child knew nothing of what was going to be done—the chloroform kept her in utter insensibility of what was done, and she only awoke to be conscious of the absence of a limb, the seat of protracted disease, which had nearly exhausted her vital powers.

Doctor Burgess administered the chloroform, merely applying it on lint to the mouth and nostrils, whilst Drs. Gee, Bride, and Mr. J. Ferguson, with their usual tact and humanity, rendered every requisite assistance.

The patient, on coming to, seemed to be excited in a manner not dissimilar from the effects of an overdose of champagne.

Mississippi Valley Association of Dental Surgeons.—This Association commenced its third annual meeting in Cincinnati, September 7, 1847, and, judging from the proceedings as published in the first number of the "Dental Register," it was well attended. The opening address was read by Dr. E. Taylor, president of the Association, and contains many important and valuable suggestions on the importance of high professional attainment. It should be read by every member of the profession. He points out in a clear and lucid manner the mutual obligations of the members to each other. Having banded together for the purpose of mutual instruction, each is bound to contribute all in his power to the common fund of professional knowledge, as the whole is made available to him, and Dr. T. would make it his proud ambition to have the largest possible amount of capital invested in this fund. He urges this importance of correct practical information, and as correct theory is necessary to this, he incidentally glances at the branches of knowledge that should enter into the education of the practitioner of dental surgery. Dental empiricism finds no favor with Dr. T. and to a certain class, he deals some very keen thrusts, but we fear his prediction, that as they, "like Jonah's gourd" "grow up in a night" will "perish in a night," is not likely immediately to be fulfilled. If we had room, we would publish the opening address entire, but as we cannot do this, we would advise such of our readers as may be desirous of procuring it to subscribe for the Dental Register.

Dr. A. Berry, read an interesting address on tobacco, in which he briefly notices the properties and effects of this herb upon the animal economy. An address was also read at the same meeting by Dr. Rogers,

on "Nerve Killing," and another by Dr. J. Allen, on the contour of the face.

We should be glad to notice the proceedings of the Association more at length, but we have not time to do so at present. The officers for the ensuing year, are Wm. B. Ross, president; W. E. Ide, D. J. Hunt and B. B. Brown, first, second and third vice-presidents; J. Allen, recording secretary; James Taylor, corresponding secretary; and C. Bonsall, treasurer; examining committee, W. H. Goddard, M. Rogers and Edward Taylor; executive committee, S. Griffith, A. Berry and J. Allen, edititing and publishing committee, S. P. Hullihen, B. B. Brown and James Taylor.

The subjects of the addresses for the next annual meeting which is to be held in Cincinnati the first Tuesday in September, 1848, are black teeth, plugging teeth, extracting teeth, irregularity of the teeth, cleanliness of the mouth, and pivot teeth. Dr. B. B. Brown is appointed to deliver the opening address.—*Balt. Ed.*

Nævus.—Some very singular examples of nævi materni are occasionally met with, but the most curious case of which we recollect to have ever heard, is described in a letter recently received by us from C. C. Porter, dentist, of Jacksonville, Ala. He says, "I operated on a lady's teeth about three months before her confinement, and among other operations, separated the right inferior bicuspides which were decayed on their sides carrying the file a little below the termination of the periosteum upon the necks of these teeth, giving her considerable pain, and causing her to become faint." On the birth of the child, an incision an eighth of an inch deep, from which blood was issuing, says, Mr. C. "precisely in the place in the gums of the inferior maxillary where the teeth of the mother had been separated." With regard to the cause of this singular phenomenon which we can regard in no other light than as a variety of nævus maturnus, it is, as in the case of other nævi, involved in too much obscurity for us to attempt to explain. Our correspondent will, therefore, please excuse us for not attempting to answer his "query," "the why and the wherefore of this singular occurrence?"

Nævi are supposed by some, to be produced by the operation of the mind or imagination of the mother upon the fœtus in utero, but this opinion is scouted by most medical writers. There are many circumstances, however, which go very far to favor this hypothesis.

Amalgam.—So extensively has this article been used for filling teeth—so ample have been the opportunities of almost every practitioner of dental surgery of observing its effects, and so frequently have we expressed

our opinion with regard to its suitableness for this purpose, that we had not supposed it necessary to recur to the subject again, and we do so very reluctantly, because of the unpleasantness of feeling that has already resulted from the discussion to which it has, within the last two or three years, given rise; but, as we have recently been asked for our views in relation to it, we will again give them as briefly as possible.

During the last twelve years, we have seen some hundreds, perhaps a thousand or more, of teeth, which had been filled with amalgam, and we do not recollect to have met with a single case in which either some bad effect had not resulted from its use, or the decay in the tooth was not as perfectly arrested as it might have been with gold. It is true, in perhaps one-fourth of the cases the teeth were dead, and had acted as morbid irritants before they were filled, and could not have been prevented from doing this by any treatment, but the diseased action which they excited, had, evidently, in most of these cases, been very greatly aggravated, and would have been in some of them, even had gold been employed. But in many of the teeth which had not lost their vitality, a diseased action had been set up in the gums and alveolo-dental periosteal tissues, subsequently to their having been filled, as a consequence of the presence of the amalgam in the teeth, as was proven by the fact, that, in a number of cases from which it was removed, these parts immediately assumed a healthy condition. We have, also, known it in a number of instances, where several large cavities in the same mouth had been filled with it, to produce salivation, and it always gives to the teeth a disagreeable aspect, often causing them to assume a greenish or black appearance.

We believe the most strenuous advocates for its use, acknowledge it to be a bad material for filling teeth—altogether inferior to gold, and only recommend the employment of it in those cases, where, as, they say, the latter article cannot be used. This, so far as we have been able to learn their sentiments with regard to it, is the position which they assume, and if it can be shown that any tooth that can remain in the mouth without exerting a morbid influence upon the surrounding parts, can be filled with gold, their advocacy of its use, must cease. The affirmative of this question has already been assumed in the proposition made by Dr. Westcott, more than a year ago, to fill any such tooth with gold, provided it can be filled with amalgam, and no one, that we are aware of, has yet accepted the challenge. Until this is done, and it is shown that the Dr. is unable to redeem his pledge, we are bound to maintain that gold may be successfully employed in *all cases* in which it is proper to attempt the operation. Our own experience and observations fully warrant the belief that Dr. W. will be able to redeem his pledge whenever put to the test. At any rate we have yet to see the first case, in which it could not have been done. We have replaced amalgam fillings with gold, in many, very many cases, in which the patients had been informed that it was

impossible so fill these teeth with any other material, and not in a *single instance*, to the best of our recollection, have we failed to do this, after having removed a filling of this sort with that intention. We replaced several a few weeks since for a gentleman from Virginia, who had them put in his teeth, a few days before, by a dentist in New York, who assured him, that gold fillings could not be inserted as the teeth were too much decayed to retain this latter material. The teeth, it is true, were badly decayed, but we succeeded in filling every one of them with gold, but in two of which, we used about eighteen leaves of No. 4, and bestowed upon them eight hours hard labor. We were occupied, altogether, in the operations upon the teeth of this individual about three days.

The only advantage, then, which we can perceive, in the use of amalgam is, that it saves labor, and if it saved teeth as perfectly as does the skilful use of gold, this, it must be confessed, would be a great matter, but as no one pretends to argue that it does, we must contend for the use of the latter, in *all cases*, in preference to the former, and until we shall have more convincing proofs that we are in error, we shall continue to use it. We do not, however, wish to dictate to others the practice which they should pursue, and however much we might desire to persuade such as contend for the use of amalgam only in "certain cases," that they are in error, we would not do it, as they may be as honest in their convictions as we are in ours, without convincing them of the fact. We think we might do this with some, if we could persuade them to bestow from two to four, or, if necessary, six hours labor, upon a gold filling, in a tooth which they have hitherto been in the habit of regarding as incapable of being filled with any other material than amalgam. It is in this way that we have become fully convinced that any tooth susceptible of being securely filled with the last mentioned material, can be filled with gold, if the organ can remain in the mouth with impunity. If this can be done, no matter how great the labor, or large may be the quantity of gold required in the operation, we cannot believe any one justifiable in using amalgam.

That this material is used by some who stand high in the profession, we do not pretend to deny, but if it can be shown, as we think it already has been, that gold can be successfully employed in those very cases, in which, *only*, they recommend the use of amalgam, condemning it as they do in all others, the opinion and example of such practitioners upon this subject is worth nothing at all. We have been referred to a few gentlemen of high professional standing by some of the advocates for the use of the article in question, as justifying their own practice with regard to it, but we cannot, with our present knowledge and experience upon the subject, consent to be influenced by their opinions in this matter, and, therefore, must be excused for dissenting from them, and adopting a practice which we conceive to be more in accordance with sound therapeutical principles.

In thus differing with gentlemen, for many of whom we entertain feelings of friendship and esteem, and whose opinions upon other subjects connected with the science and art of dental surgery, we highly respect, we are actuated by no other motive than a desire to promote what we sincerely conceive to be correct practice; and believing that the use of amalgam for filling teeth is fraught with pernicious effects, we feel bound to discountenance its employment.

But while there are some, even among those whose opinion on many subjects, we highly respect, who believe that amalgam may be, *sometimes*, advantageously employed, we are happy to know that its use, in *all cases*, is condemned by others, both in this country and Europe, who, for scientific attainments and practieal skill are unsurpassed. It has, also, by unanimous vote, been pronounced by the Virginia and Mississippi Valley Associations of Dental Surgeons, to be mal-practice.

As to the chemical properties of amalgam, and the changes it is liable to undergo in the mouth, these have all been so accurately enumerated by others, that we do not deem it necessary to recapitulate them at this time. We shall, therefore, conclude our remarks, for the present, upon this subject, by simply observing, that, as for ourself, we desire no better material for filling teeth than GOLD.

Since writing the foregoing, we have received the New York Journal of Medicine for November, which contains two articles upon the use of the material under consideration—one from Dr. John Trenor, and the other from Dr. Eleazar Parmly. The first seems to be a labored effort to prove that amalgam may be advantageously employed in many cases—especially for filling the deciduous teeth, and that it cannot in any case undergo decomposition or oxydation and exert a deleterious effect upon the mouth or general system. He narrates some cases in support of the position he assumes, but most of the facts connected with them are so singularly at variance with well established principles of pathology that they can only be regarded as exceptions to the general rule. We have met with many cases where effects similar to those described by Dr. T. had been produced by amalgam fillings in *living* teeth, which were removed by replacing them with gold, but have yet to see the *first*, where they have developed themselves around *dead* teeth, and have been *completely* removed while the teeth were permitted to remain in the mouth. Now if the teeth which Dr. T. mentions did not act as *local irritants*, and if the cause, as he supposes was wholly constitutional, the gums would have been *equally* affected around all the teeth. But if, on the other hand, the teeth in question did act as *morbid irritants*, as they evidently did, the correct practice would have been to have extracted the teeth.

With regard to the chemical changes which amalgam often undergoes in the mouth, Dr. T's assumption is opposed by too many facts to be

worth any thing at all. In fact, every position which he assumes is shown, by the most incontrovertible facts, adduced by Dr. Parmly, in the same number of the Journal in which his article appears, to be erroneous.

That the oxydation and discoloration of amalgam fillings may be favored by galvanic action, we think very probable. At any rate, we come to this conclusion some eight or nine years ago, and wrote a short article upon the subject, which was published at the time, in a Baltimore daily paper. This opinion is ably maintained by Dr. Slack, professor of chemistry, in the Ohio Medical College, in a well written paper copied into the present number of the Journal from the Dental Register, and by professor Westcott, as may be seen by the article of Dr. Parmly alluded to above.

Finally, assuming that the articles of Drs. Trenor and Parmly contain a fair exposition of the views of the advocates for, and opposers of the use of amalgam, together with the arguments for and against it, we should be glad to copy both into the Journal, but cannot do so at present, for want of room.—*Balt. Ed.*

New York Dental Recorder.—With the commencement of the second volume of this periodical, the editorship of the New York Dental Recorder, was transferred to Dr. C. C. Allen, an experienced dentist, and good writer. We have received numbers one, two and three of volume two, which contain a number of well written and interesting papers, and we are glad to perceive among the number, one from our London correspondent Dr. J. Robinson, copied from the American Journal of Dental Science.

It is said of the dental profession, that its members, as a body, are not reading men, that they have no taste for, nor pretensions to science, that they are satisfied with a mere meagre knowledge of the mechanical manipulations of the art. If this assertion has hitherto been true and even is at the present to some extent, we hope that not a single dentist will consent to remain under so disreputable an imputation any longer, but from this time henceforth resolve to avail himself of every means of information within his reach, and as publications of this sort are among the best, they should not be without them. The Dental Recorder is published in monthly numbers of twenty pages each at $2 per annum. We trust it will be well sustained. It may be had by application to Dr. C. C. Allen, 28 Warren street, New York.—*Balt. Ed.*

The Dental Register of the West.—We have received the first number of a periodical published under the above title. It contains fifty-four pages, and is published by the order of the Mississippi Valley Association of Dental Surgeons, and edited by professor James Taylor, M. D of

Cincinnati, Ohio, and B. B. Brown, M. D. of St. Louis, Mo. The editors are both well known to the profession as dentists of high standing, and under their management there need be no fear with regard to the manner in which it will be conducted. It is to be published quarterly at $2 per annum. Besides the proceedings of the last meeting of the Association, whose organ it is, it contains several valuable and highly interesting articles. We commend it to the patronage of the profession, and most cordially wish our brethren of the west success in so commendable an enterprise.—*Balt. Ed.*

Fourth Dentition.—Early in the spring of 1844, Sherman Bartholomew, a young lad, aged fourteen years, called at my office with his mother, for the purpose of having his teeth examined, they both at that time having always resided at our place.

We were doubly surprised on looking at his mouth; first, that he had any superior frontal incisores at all, for we had known of his losing his two superior *permanent* frontals, by a severe fall some four or five years previous; and secondly, to find the vacancy supplied by what appeared to be two *temporary* incisor teeth. All the rest of the teeth were perfect, the whole second dentition being otherwise complete, except the *sapientiæs.*

Perhaps it may be as well at this time to state that the young man shed his temporary frontal teeth as usual, at about seven or eight years; these were soon succeeded by large and well formed permanent ones. About a year and a half afterwards he fell headlong from a high flow of water, near his parent's residence, into a pile of stones, which resulted in completely separating the two frontal incisores from their sockets, and driving them out of his mouth, they were placed back again and every effort made to induce them to remain and heal, but to no avail, and they were removed, (these the young man had in his possession at the time.)

Thus time passed on, the remaining permanent teeth gradually taking their respective places in the jaw; the two lateral superior incisores continually approaching each other, apparently with the *intention* of filling up the interval between them so far as possible, until about two years after the accident referred to, two frontal *temporary* incisores made their appearance and dropped down between the permanent laterals, just filling the space, as regards *breadth*, though shorter as compared with their neighbors in length. These *triplets* he wore some three years or more, when he came to my office as referred to.

We found a large dual-shaped bunch immediately above the specified teeth, directly under the upper lip, and found, also, the two frontal teeth quite loose. We coincided with the mother in the opinion that teeth were concealed beneath the bunch, and only awaited a favorable oppor-

tunity to make their appearance, We extracted the second temporary set; found no roots to them, they having been previously absorbed. We directed the young man to call at our office about a week from that time' he did so, the teeth within the bunches had apparently extended considerably downwards, and the gums *seemed* in a proper condition to lance, they being whitened and evidently constrained over the points of the teeth within the jaw. On lancing them my anticipations were realized in finding teeth immediately under the places referred to.

In a few weeks two large permanent incisores made their appearance; as they became more and more visible, we made efforts to direct them within the circle of the jaw to take the place of the former ones. To this end, finding one of them directly over the right lateral incisor, and also, owing to there not being sufficient room for the "new comers" between the lateral incisores, we extracted the right lateral incisor. The right frontal incisor soon found its proper place; but we found great difficulty in changing the position of the left frontal, indeed we could not move it at all from its original place, though we adopted the usual means and continued them for several months, we were at quite a loss to account for this, until our attention was again directed to a small protuberance within the circle of the jaw, and immediately under the untractable tooth, and evidently preventing it from coming down to its place. We at once conceived the idea that another tooth made its home within the protuberance, and that it soon would emenate from its place of concealment, and show its *classification* and *order!* We had come to the conclusion that after such a profusion of incisores, nature true to her "fondness for variety" would give us a tooth of a different character, but whether it would be molar, bicuspid or cuspidati, the future was to show. We did not, however, wait long to have our curiosity gratified, in a short time the tooth presented itself from the protuberance within the dental arch. This last, was of no particular *order*, indeed altogether "out of order!" a kind of *hybrid*, something between an incisor and cuspidatus. This we extracted, when the left incisor soon came down to its place.

A few months afterwards, the patient, with his parents, removed to the state of Illinois. During the past summer one of my neighbors received a letter from the mother of my patient, in which was a message to us, to the effect that her son had had another tooth within the circle of the jaw under the *right* frontal incisor, corresponding in position with the one we last extracted, on the opposite side; and that on extracting it, they found it corresponded in every respect, so far as they could recollect, with the one we extracted more than three years before.

There can be no doubt of the genuineness of this strange "freak of nature." The first *permanent* set of frontals we saw in the mouth of the patient shortly after the accident which resulted in their loss, and we have also seen them subsequently. The second *temporary* set we extracted

ourselves. The *second* permanent set, or *fourth* set proper, are in the head of the patient at this time. One of the *fifth* succession we also extracted. Relying with confidence, as we do, upon the authority of the mother, together with the analogy of the case, we have no doubt of the *sixth* presentation.

The fourth incisores are decided and distinct in their character, only differing from ordinary teeth in that the outline of their lower edge is somewhat unusually undulating or dentated; they are well formed and of good texture and color, leaving an uncertainty as to their true classification; and the conclusion is irresistible that they constitute a genuine case of *fourth dentition!* The two others which followed at intervals, afterwards, were probably nothing more than supernumeraries.

Taking in view the age of the patient, the rapid reproduction and succession of the teeth, their good texture and quality, we consider it one of the most remarkable cases that ever came under our observation, or that we have ever seen on record. We will not at this time enter the field of speculation to attempt to account for the principles by which this singular manifestation of nature was produced, having already extended this report too far.

A box containing representations in wax of the case at *four* different stages of progress, together with one of the second temporary teeth, and one of the supernumerary ones, is in the Museum of the Baltimore Dental College.—*Cazenovia Ed.*

[The above report was intended by the writer to be illustrated with engravings, but it came to hand at so late an hour, that it was impossible to have them made in time for the present number; consequently, we were compelled to omit them. The models of the case are beautifully prepared and arranged, and may be seen at any time in the Museum of the Baltimore College of Dental Surgery.—*Balt. Ed.*]

The Dental News Letter.—We have the pleasure of noticing still another dental periodical, the Dental News Letter, to be published quarterly by Messrs. Jones, White & Co., New York, each number to contain sixteen pages. It is well printed and contains some very good articles.

There are now five periodicals devoted to the interests of the dental profession; namely, the Americal Journal and Library of Dental Science, the Dental Intelligencer, New York Dental Recorder, the Dental Register of the West, and the Dental News Letter. There is room enough for all, but we fear none will prove very profitable to the proprietors.

[*Balt. Ed.*

Obstinate Hæmorrhage from the Extraction of Teeth.—A gentleman, about twenty-one or twenty-two years of age, called upon us a few weeks since, who, two days before, had had the first left superior molaris extracted by a dentist at a country village, some twenty or twenty-five miles from Baltimore. The hæmorrhage which immediately followed the operation, was not great, and in a few minutes nearly subsided, but in a few hours it become so profuse that he was induced to call on the dentist again, who applied from time to time, for more than twelve hours, the various means usually employed for arresting hæmorrhages of this description, but without success. The bleeding continued until he become so much reduced, that serious apprehensions were entertained with regard to the consequences likely to result from it.

Under the above circumstances he came to the city. He arrived about eight o'clock in the evening, and applied to us immediately for relief. Upon examining his mouth, after freeing the alveolus from the partially coagulated blood, we found that the bleeding was principally from the socket and inner margin of the gum. We now filled the socket with pledgets of raw cotton, saturated in tinct. nut galls, packing them as closely as possible; after which, we applied a thick compress. This last was held in place by closing the teeth of the lower jaw firmly against it. A strong bandage was now applied under the chin and over the top of the head in such a manner as to prevent the lower jaw from being depressed.

The hæmorrhage immediately ceased, but about five o'clock the next morning, the bandage becoming partially loosened, the bleeding commenced again, and continued for more than two hours before I was sent for. The blood now seemed to come from the inner edge of the gum where it had been separated from the alveolar border. Compresses were again applied together with the most powerful styptics, but to no purpose.

The application of the actual cautery, now seemed to be the last resort, and not being provided with a steel or iron instrument of a proper shape, the patient being at a boarding house in the immediate vicinity of Professor Smith's, I requested this eminent surgeon to see him with me, and to come provided with one that might be employed for that purpose. This he did, and concurring in the opinion that the actual cautery should be used, it was immediately applied and at once put a stop to the hæmorrhage.

The foregoing is the only case which has ever fell under our own immediate observation in which hæmorrhage from the extraction of a tooth could not be promptly arrested by the application of a suitable compress introduced into the socket. We have had a number of cases, in which, from a constitutional hæmorrhagic diathesis, the bleeding was so profuse and continued so long as to excite a great deal of alarm, but never before failed to arrest it by plugging the socket with sponge or raw cotton saturated with some strong liquid astringent. The immediate replacement of the

tooth into the alveolus, is recommended by some writers. The mouths of the bleeding vessels may, unquestionably, be more thoroughly compressed by this means, but a plug of raw cotton or sponge, will, in most cases, be found equally efficient, and as it is productive of less mechanical injury, it should, as a general rule be preferred.

A New Wax-holder for taking Impressions of the Mouth.—We are indebted to G. F. J. Colburn, Dentist of Morristown, N. J., for an improved wax-holder, for taking impressions of the mouth, which he has had the kindness to send to us, and for which, we tender him our thanks. We have not yet had an opportunity of using it, and cannot, therefore, speak from experience of its advantages. The difference between it and those in common use is, that it has two rims attached to the outer margin of the plate and instead of describing a half circle, its extremities are turned out. The outer rim is intended to protect the wax against injury from the cheeks and corners of the mouth in removing the impression. The author of this improvement says, he has often succeeded in procuring an accurate impression with this frame, after having failed with those in common use. After we shall have tried it, we may, perhaps, be able to say more concerning it.—*Balt. Ed.*

A New Antagonizing Instrument for double sets of Artificial Teeth.—Dr. James Lock, surgeon dentist of Milton, Pa., has recently sent us a very simple and at the same time quite an ingenious machine for antagonizing a full set of artificial teeth. A great variety of contrivances have been invented for this purpose; some of which have answered a tolerably good purpose, and Dr. L's, we doubt not, is as well suited to the purpose as any instruments of this description, but it is impossible to arrange a set of teeth in a machine of this sort, as accurately as in a true plaster articulating model. It is true, great care is necessary for the procurement of a correct plaster model of this sort, but when obtained, it is incomparably superior to any other means that can be resorted to, for arranging and antagonizing artificial teeth. Nevertheless, we are greatly obliged to Dr. L. for his kindness in sending us the instrument which he has invented for the purpose.—*Balt. Ed.*

Correction.—We published in the last number of the Journal, an extract of a letter from Dr. E. Townsend of Philadelphia, giving a description and drawing of a tongue-holder. This letter was addressed to Dr. Westcott, and only that portion of it which contained the description of the instrument was sent to us for publication. We have since learned by letter from Dr. Townsend, that he was not the inventor, but that the credit of this belongs to Mr. Lawrence, an ingenious young gentleman a student of his.—*Balt. Ed.*

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ARTICLE I.

A Course of Lectures on Dental Physiology and Surgery, delivered at the Middlesex Hospital School. By JOHN TOMES, ESQ., Surgeon Dentist to the Hospital.

(Continued from p. 147.)

LECTURE X.

DENTAL CARIES—PHYSICAL CHANGES OF THE DENTINE AND ENAMEL—CAUSE OF CARIES—THEORIES OF DENTAL CARIES—ANALOGY OF DENTAL TO OSSEOUS CARIES—TABLES OF THE RELATIVE FREQUENCY OF CARIES IN THE DIFFERENT TEETH, AND IN DIFFERENT PARTS OF THE SAME TEETH—CAUSES AND THE TREATMENT OF CARIES.

Diseases of the Dental Tissues.

CARIES, dental gangrene, or decay, are the various names by which the disease I am about to describe is known. It is but of little consequence which of these we select for our present use; but as caries is the oldest, as is as expressive of the nature of the disease as the others, while it has the advantage of being short, we will, if you please, adopt that term.

Caries may be defined to be, death and subsequent progressive decomposition of a part or the whole of a tooth.

The physical changes which mark the progress of the disease are first observable on the periphery of the dentine, under the enamel, which latter is, over the affected spot, either itself slightly discolored, or unusually opaque and white. The diseased dentine generally becomes changed in color, and assumes a brown hue, more or less deep according to the rapidity with which the decay has advanced. The slower the process of decomposition the deeper will be the color of the carious portion, and *vice versa.* The decomposed condition advances gradually from the surface towards the centre of the tooth, invariably taking the course of the dental tubes; and as the various branches of these converge, in their passage inwards, to join the main tubes, which open on the surface of the pulp cavity, the diseased mass is consequently of conical form.

After a while the surface of the dentine immediately under the enamel becomes softened by the loss of its earthy ingredients; the enamel itself affected, and no longer supported by the subjacent dentine, falls in, and a cavity is formed in the tooth, which increases in depth, following the course of the tubes, and at the same time extends laterally by the extension of the disease on the surface of the dentine, and from thence inwards. By a continuance of this destructive process an opening is formed into the pulp cavity, and, eventually, the whole of the crown of the tooth is destroyed. After the removal of the earthy constituents the gelatine of the tooth is at first firm and elastic, like cartilage, but it soon softens by decomposition, becomes disintegrated, and is lost in the saliva; thus a cavity is formed in the tooth, which is occupied by the fluids of the mouth and small particles of food. The crown being destroyed, the disease is frequently arrested. The roots of the affected tooth having a higher degree of vitality than the more exposed crown are proof against the influence which lead to the destruction of the latter. You will meet with a few instances where the decay has been completely arrested after destroying only a portion of the crown. In these cases the surface of the so-formed cavity will be found of a dark brown color, but hard and highly polished, like the surface of eburnated bone.

The fissures in the masticating surface of the grinding teeth, or those surfaces of the teeth which lie in contact with the contiguous teeth, are the situations usually attacked by caries.

The diseased action is not attended by severe pain, but I am disposed to think that even early in the disease there is in almost all cases a feeling of slight uneasiness in the affected tooth, though the degree may be so slight as to escape detection at the time, or lead only to the supposition that some foreign matter has got between the teeth. I am induced to adopt this opinion, though at variance with several authors of distinction, both from the description given by patients who have suffered from caries, and also from personal experience in this unpleasant malady. On several occasions my attention has been drawn to a tooth by a sensation not, perhaps, amounting to pain, but to slight discomfort only, which has lasted for a few minutes. After a recurrence, from time to time, of this unpleasant sensation, I have examined the tooth, and have invariably found that caries has commenced in the situation from whence the uneasiness seemed to proceed.

Again, a few cases are met with in which there is considerable pain attending the progress of caries, long before the pulp is at all affected by exposure, or by the contact of partially decomposed dentine. The tooth is, from the commencement, highly sensitive: the contact of hot or cold fluids induces severe pain, and any attempt to remove the carious dentine, though the disease has existed but for a short time, and is very slight in extent and depth, produces such unbearable pain, that the attempt is for the time obliged to be abandoned.

The causes and nature of caries are variably estimated by different writers, but the theories advanced, in explanation of the subject, may be arranged under one of the two following heads. The first includes those in which caries is in itself considered a vital action and the result of inflammation; the second includes those in which caries is regarded wholly as the result of chemical action, and caused by the presence of decomposing matter lodged in the interstices of the enamel. I should, however, at starting, state that these doctrines were pro-

mulgated long before the structural anatomy of the teeth was understood. Fox endeavors to show that dental is in nature similar to osseous caries; he assumes that separation of the periosteum is the cause of caries in the bones, and that separation of the pulp from the surface of the pulp cavity is the cause of dental caries: and, further, that in each case the separation is the result of inflammation. Mr. Bell advances the opinion, that caries is the result of inflammation in the dentine itself, and that, from the low degree of organization of that tissue, it is unable to recover from active inflammation. He says, "The true proximate cause of dental gangrene is inflammation, and the following appears to me to be the manner in which it takes place. When, from cold, or any other cause, a tooth becomes inflamed, the part which suffers most severely is unable, from its possessing comparatively but a small degree of vital power, to recover from the effects of inflammation, and mortification of that part is the consequence. Many subsequent writers have, with slight and unimportant variations, supported the views of these great authorities on dental surgery. Mr. Robertson, of Birmingham, stands pre-eminent amongst those who assume that caries is nothing more than chemical decomposition of the tooth, and who assert that the tissues composing the teeth are devoid of life, and that, therefore, vital action cannot occur in them.

These two classes of opinions are sufficiently at variance with each other. I think, however, I shall be able to convince you that they are, taken together, both right, but that neither, taken alone, will account for all the phenomena of caries.

I believe that the dentine from abnormal action loses its vitality, and with the loss of vitality the power of resisting chemical action, and that, consequently, the dead part is under favoring circumstances decomposed by the fluids of the mouth. Further, I conceive that the causes producing the abnormal action may have been applied locally to the tooth itself, or may have had a constitutional origin, and, therefore, have acted through the nerves or the circulating fluids.

To support these views it will require that I should go a lit-

tle more at length into the subject. Time, however, cannot be misspent when devoted to the consideration of a disease so universal in its presence, and at the same time so prejudicial to the health and comfort of those whose teeth are affected. You will recollect that the surface of the dentine is composed of the terminal branches of the tubes, and that, in addition to these, there are a vast number of small cells present in the part which is immediately covered by the enamel. With these cells the tubes communicate, and in addition some few pass into the enamel. On the surface of the dentine so composed the first physical changes denoting the existence of caries are observable.

I have shown you that a dead tooth is pervious to fluids. A tooth that has been some little time removed from the mouth, and kept in a dry situation, becomes perfectly opaque, especially the enamel, and the more so if the tooth be taken from the young subject. But if we immerse the dry, and consequently opaque tooth in water, it will absorb gradually through the external surface a considerable quantity of the fluid, and thereby become slightly translucent. From these circumstances we learn that the fluids of the mouth may permeate the substance of a tooth if there is no vital action to oppose their doing so, and supposing them to have permeated, they may, if they be of an active character, and there be present in the dentine no restraining power, decompose the substance of the tooth. As the solvent menstruum enters from without, the more external part of the dentine will be the first to be affected; again, the fluid finding a ready passage through the tubes, travels inwards towards the pulp cavity, contracting in its extent as the tubes converge. Further, we find decay travels under the enamel on the surface of the dentine: this circumstance is fully accounted for by the presence of the numerous cells and their frequent connection with each other in this part. It will be inquired why, as the decomposing agent enters through the enamel, is it that that tissue is not the first to suffer? Strictly speaking it may be the first, but as a much stronger solvent is required, or the longer application of the same solvent,

to produce similar impressions on the enamel, the effect is first perceived in the dentine. If we place a tooth in a weak solution of muriatic acid we shall find that the exposed dentine is affected before the enamel, and the exposed dentine before that covered by enamel. As a further testimony of the correctness of this view of the chemical solution of the earthy ingredients of dead dentine in caries, it may be urged that the action first shows itself in a situation where a fluid or semifluid might be kept in undisturbed contact with the surface of the tooth for some time: thus in the fissures of the masticating surface of the molares, or on the laterally opposed surfaces of the teeth, in either of which situations the debris of food may remain unmolested for hours, and thus enable the fluid with which it is saturated to enter the dentine. If an acid be the solvent, removing the earth of teeth, it would seem probable that its presence might be detected. With this view I have repeatedly applied litmus paper to carious teeth, both before and immediately after their removal from the mouth, and have almost invariably found strong evidences of the presence of a free acid.

So far we can understand the course which dental caries takes from our knowledge of dental structure, and can understand how the decomposition of the dentine is effected; but this point will be even more intelligible after an examination of the affected tissue with the microscope. A transverse section of carious dentine, rendered soft like cartilage from the loss of its lime, presents a cribriform appearance. The tubuli seem enlarged and rather irregular, quite unlike the figure they present in healthy dentine: this would indicate that the solvent enters and acts upon the parietes of the tubes previous to affecting the inter-tubular tissue, and that the parietes of the tubes are, therefore, the first to disappear. I feel quite certain that in the cases I have examined, and they are numerous, that the parietes of the tubuli so distinguishable in healthy dentine have almost, if not wholly, disappeared with the removal of the lime.

As regards the source of the solvent agent some little inquiry is needed. The saliva is in many cases, where decay is rapidly progressing in several teeth at the same time, strongly

acid. The stomach frequently during the day secretes gastric juice, which, if eructated in a very small quantity, would be sufficient to keep up the dental decomposition already commenced. In seeking the source of the acid you must not forget that the actual amount of phosphate of lime contained in a tooth is small; and, further, that the destructive action is often very slow and spreads over many months. The presence of the least appreciable quantity of solvent would, therefore, be required, and even this where the decay is slow only at intervals. You will find a statement in Simon's Animal Chemistry (translated by the Sydenham Society,) to the effect that the saliva under certain circumstances is acid, and that this condition is not uncommon after salivation. But quite apart from the saliva as a source of acid, I think we take a sufficient amount in our food to effect the slow decomposition of dead dentine.

It is not rare to meet with a case in which the saliva is strongly acid, either in itself or from the admixture of fluids from the stomach; and, should the gums have receded and left the necks of the teeth unprotected from the direct contact of the saliva, the exposed portion below the enamel will be deprived of its earthy matter, and the crown will be at last either cut off from the fang by the decomposition of the neck, or will be itself in a great part decomposed. We commonly see instances of this in patients who from indisposition take some of the mineral acids.

Artificial teeth are frequently made of natural human teeth, fixed on a plate fitted to the gums. In these, decomposition goes on just as in the natural teeth; but there is this difference; you may always know where decomposition will take place, namely, wherever the dentine is unprotected from the contact of the oral fluids; and in most persons, though not in all, the artificial teeth will, in course of time be wholly decomposed. Thus, in the bicuspides, the decay will commence on the masticating surface, if the pin fixing it to the plate be brought through and insufficiently rivetted: also, on the surface fitted to the plate. In either of these situations the saliva may get in and remain in contact with the surface of the dentine.

Thus, we have ample proof that dead dental tissue will, under favorable circumstances, be gradually decomposed by the fluids of the mouth; but there are conditions which, if present, entirely prevent or greatly retard its decomposition. The saliva may be so charged with phosphate of lime that it is thrown down in considerable quantity wherever the salivary fluid remains at rest. It collects in large masses upon the posterior part of the necks of the lower incisores; and I have seen the cavities of decayed teeth completely filled with the deposit.

Supposing, then, this condition to prevail, the oral fluids, that is, the saliva and mucous secretion, being already saturated cannot dissolve more phosphate of lime; and dental decomposition, therefore, cannot commence, or, if commenced, cannot advance. It must not, however, be supposed from what I have said that in all cases where phosphate of lime (or tartar, as it is more commonly called) is present on the teeth that dental decay will be arrested; the state of the saliva may have changed since the deposit of the tartar, or, though the saliva may be alkaline, the secretion from the mucous membrane of the gums may be acid; and, supposing such to be the case, we should hardly expect that the secretion thrown out from the membrane between the teeth would be neutralised, as mucus does not readily mix unless agitated with another fluid; and such agitation would not take place in that lodged between the teeth, or in fissures or cavities of teeth.

Dead dentine will also resist the action of the oral fluids, if the surfaces be highly polished. Thus, if the surfaces of artificial teeth constructed wholly of dentine be highly polished, and the polish be constantly kept up by the wearer, the teeth will not be acted upon, unless the decomposing agent be unusually strong; but, if they are polished in one part, and left rough from the file in another, decomposition will quickly commence on the rough, while it is resisted by the polished surface. You will scarcely find a set of artificial teeth that have been worn in which this point is not more or less illustrated. Those surfaces which are exposed to the action of the tongue, or of the springs, are kept highly polished, and in these situations decay is effec-

tually resisted, while the parts lying in contact with the gums are gradually softened, and the teeth become unfit for use. Again, if a tooth from any cause (as by filling) be deprived of enamel, the exposed dentine will in most cases soon be robbed of the lime, unless the surface be polished and kept in that condition. We have frequent opportunities of observing exposed and eburnated dentine in teeth that have been worn by the action of the antagonist teeth, and these, we see, have resisted decomposition.

From the foregoing facts, we are led to conclude that dead dental tissue, when retained in the mouth will be decomposed or not, in accordance with the circumstances under which it is placed, and that the decomposition is effected by agents applied externally.

Before leaving this part of the subject, I will call your attention to a very curious fact in regard to bone. Mr. Gulliver, by a series of experiments instituted to ascertain whether dead bone was absorbed or not, found that a portion of human bone introduced into the medullary cavity of a rabbit's tibia not only remained there without exciting inflammation, but became united to the adjoining bone; and in other experiments, where union was not effected, living bone was deposited upon the dead bone.*

It is thus sufficiently apparent that dead bone may exist without our knowledge of its presence.

I find there is some difficulty in making an accurate comparison between the caries of teeth and of bones. Surgical writers are not very definite upon the point as to how the osseous tissue is affected; neither can I find any good account of the chemical nature of the discharge from a carious bone.

* Medico-Chirurgical Transactions, vol. xxi, p. 16, expt. 16.—A portion of the shaft of the human tibia was weighed and introduced into the tube of a rabbit's tibia; seven weeks after which the animal was killed.

The limb was macerated for three months during the summer, when a part of the circumference of the tibia being removed to expose the foreign bone, it was found firmly adherent to the inner surface of the rabbit's tibia, and the union was effected by true osseous substance, as proved by the analysis of Dr. Davy, E. P. B., 56, in the museum of the Army Medical Department.

In South's translation of Chelius, I find, in a note from Miescher, under the article *caries*, the following statement:—"We see it asserted in the works of not a few writers, that in a carious ulcer the pus may be perceived to be, as it were, sandy to the touch, and containing *bony particles* oftentimes pretty apparent." Again, he says, "the whole surface, therefore, attacked with caries presented various stages of separation of the dead plates, by which the roughness felt with the probe was easily explained, as well as the corroded appearance of *the softened bone*, which, though less conspicuous, is discovered after the separation of the large piece of bone." Now the only means by which a piece of dead bone could be softened would be by chemical decomposition, the process being similar to that engaged in the destruction of dentine, thereby establishing a strong similarity between the caries of bone and of teeth. In caries, a portion of bone loses its vitality: the neighboring bone becomes inflamed, as do the surrounding soft textures. This leads to the formation of an abscess, which opens on the surface of the body, and also to the separation of the dead bone from the living, by the absorption of a thin layer of the living which lay in immediate contact with and connected the dead to the living bone; the former may or may not have been decomposed, the condition depending upon the nature of the fluids with which it has been bathed.

In dental caries, a portion of dentine loses its vitality, but does not, like dead bone, become separated from the living, which difference may be attributed to the very different circumstances under which it is placed, and also to its lower degree of vitality; but, on the other hand, the dead dentine will, like dead bone, be decomposed by solvent fluids, when such are present.

The crown of a tooth, the more external tissues of which are dead, the pulp and internal dentine being living, I conceive to be exactly similar in condition to an eburnated bone. The synovia of the joint in contact with the bone is not of a nature to decompose the bone, so no chemical change takes place in the osseous tissue, which, over the exposed surface of the bone, is by friction highly polished.

The saliva bathing the dead surface of tooth may not contain active ingredients; and in that case the tooth will not be decomposed.

Again, bone may be dead, but there may be no inflammation of the neighboring parts, and the dead will not be separated from the living. This we may infer from Mr. Gulliver's experiments, in which dead was introduced into the medullary cavity of living bone, became perfectly united, and the limb in which the experiment was tried sound and healthy. That state, which is occasional only in bone, is constant in dentine; dead dentine is never separated from the living by the absorption of the connecting layer of the latter.

The analogy in the diseases of the two tissues is further established by the fact that in many cases the presence of caries in the crown of a tooth leads to the deposition of dentine by the pulp opposite the point to which the disease is advancing. The dental deposit may exist only in the form of a few granules of dentine, or may extend to the formation a plate. From what has been said, you will have gathered that it is not at all times easy to know whether any or how much dentine be dead in a tooth; and the same observation may be applied to bone, as, from the foregoing statements, it would appear that all indications of death may be absent. Death of a part by no means implies immediate discoverable physical change. In a dense tissue of naturally low sensibility, we have no means of recognising the loss of vitality, except by the occurrence of physical change in the part. The color must change, decomposition must commence, or there must be alteration of figure, before we become aware of the event. Even in soft tissue, we only recognise death by finding indications of decomposition in the suspected part.

In a tooth, then, you can only pronounce that the crown has wholly or in part died, by observing that discoloration or decomposition is present in that part.

Causes of Dental Caries.—Many of the causes which favor the chemical decomposition of dental tissue may lead also to the loss of vitality which renders it susceptible of decomposi-

tion. Thus, an imperfect development of the enamel on the sides or in the natural fissures of the teeth, and a consequent exposure to the dentine to the contact of whatever may be taken into the mouth, is a very frequent cause of caries. There are but few who have not at some time experienced most unpleasant sensations, oftentimes amounting to pain, in teeth perfectly sound, when acids or sweets are taken into the mouth. In these cases the irritating fluid must have passed through the enamel and come in contact with the dentine, which we know is sensible, while the enamel is not.

Patients are occasionally met with, who state that they were attacked with pain in several sound teeth; that the pain left, but after the lapse of a short time, the teeth decayed, and left only stumps.

After fever, and especially scarlet fever, teeth, before quite sound, in some cases rapidly decay. The same occasionally occurs after salivation. Children of a scrofulous diathesis are liable to lose their teeth by caries at an early period; also, persons who suffer from indigestion with excess of gastric acid. A residence in a low damp situation is said to be a frequent cause of this disease.

Many writers assume that where teeth are crowded, great pressure is exerted upon the lateral surfaces in contact, that this causes a disarrangement of the fibres of the enamel, and thus leads to disease. I am disposed to doubt whether this is a frequent cause; you will very commonly see a most crowded set of teeth, and yet no caries. Again, if lateral pressure were a frequent cause, you would naturally expect those teeth the most subject to pressure, the first to decay, and, further, the parts of the tooth subject to the pressure would be those first affected. Yet neither the one nor the other point is borne out by experience; on the contrary, the first permanent molar is the most liable to become diseased, and the masticating surface, the point most commonly attacked, and yet this tooth is less liable during its development and eruption to lateral pressure than any other in the mouth.

Relative Liability of the Various Teeth to Caries.—For some

time past I have kept a register of every case that has come under my treatment at the hospital. The case-book has a tabular arrangement, and in each entry the name and age of the patient, and the teeth affected, are noted each in their proper columns. In those cases requiring the removal of teeth (and forty-nine out of fifty are of this character) the situation in which disease has commenced, and the instrument used in extracting the tooth, are also noted. The cases relating to permanent teeth which occurred in 1845, and the first six months of 1846, have been partially summed up, and the results arranged in the forms I now lay before you. In those instances in which it has been difficult to tell with certainty, from the extent of destruction, where the caries commenced, the probable situation has then been stated. Excepting this occasional source of error, the tables may be perfectly relied on.

I should state in explanation, that, in each case requiring removal, whatever may have been the condition of the tooth rendering immediate operation necessary, if caries was the cause of that condition, the entry was made under the head of caries. A carious tooth will often lead to alveolar abscess, but when this has been the case, as caries was the primary cause of the disease, the case has been registered as caries.

Again, destruction of the crown by caries will occasionally be followed by exostosis of the fang: the case has then also been registered as caries.

Under the head of looseness are included teeth loose from various causes, though nine-tenths have been from absorption of the alveoli, the teeth themselves being sound.

It would be a waste of time to enter into any description of the relative liability of each part of a tooth to disease, as a perusal of the following tables will give you all the definite information I possess upon the subject, and that, too, in a much more satisfactory form than a mere statement would be.

Statistical Tables of 1736 *Cases of Dental Disease, treated at the Middlesex Hospital.*

Of the 1736 permanent teeth extracted from all causes:

44 were central incisores,
65 " lateral incisores,
39 " canines,
150 " first bicuspides,
231 " second bicuspides,
642 " first molares,
389 were second molares,
176 " third molares.

Of these, 1480 were removed for the relief of diseases commencing in caries of dental tissues.

Of the 1787 permanent teeth extracted from all causes:

44 were CENTRAL INCISORES: of these
20 " from males, and
24 from females,
36 from the upper, and
8 from the lower jaw.

Of the 36 from the upper jaw:

13 were stumps,
7 " fractured.
7 " loose,
2 " dead,
1 for decay on the lateral surface,
1 inflammation of gum and periosteum,
3 for abscess,*
2 projected.*

Of the 8 from the lower jaw:

5 were loose from the absorption of the alveoli,
1 was dead,
2 were out of line.

Of the 1736 permanent teeth extracted from all causes:

65 were LATERAL INCISORES: of these
33 were from males, and
32 from females;
51 from the upper, and
14 from the lower jaw.

Of the 51 from the upper jaw:

2 were fractured,
8 for want of space,
7 were loose from absorption of the alveoli,
4 for decay on the posterior surface,
8 " external "
8 " lateral "
1 for decay on the masticating surface,
1 " not noted where,
14 were stumps,
1 for cause not registered,
1 for necrosis,
2 for abscess.

Of the 14 from the lower jaw:

6 were loose from absorption of the alveoli,
6 for want of space,
1 for cause not registered,
1 for tic douloureux.

TABLE IV.—Of the 1736 permanent teeth extracted from all causes:

39 were CANINES: of these
19 " from males, and
20 " from females,
29 were from the upper, and
10 " from the lower jaw.

Of the 29 from the upper jaw:

In 2 cases the lateral surface next the lateral incisores was attacked with caries,
2 cases the lateral surface next the bicuspides,
" lingual surface,
" labial surface,
1 " masticating surface,
1 case the situation not noted,
5 " stumps,
7 " looseness,
9 " out of line,
1 " inflammation of the gum, involving the periosteum of the fang,
1 " cause not registered.

* The teeth sound.

Of the 10 from the lower jaw:

In cases the lateral surface next the lateral incisores was attacked with caries,	3 cases of looseness producing irritation and pain,*
1 " lateral surface next the bicuspides,	2 " out of line,*
1 " lingual surface,	1 " abscess in the alveolus,*
" labial surface,	1 " tic douloureux was supposed to arise from the presence of the tooth.
1 " stumps,	

TABLE V.—Of the 1736 permanent teeth extracted from all causes:

150 were FIRST BICUSPIDES: of these,	121 were from the upper, and
70 " from males, and	29 " from the lower jaw.
80 " from females,	

Of the 121 from the upper jaw:

In 19 cases the anterior surface was attacked with caries,	13 cases the space was required for the anterior teeth,*
45 " posterior surface,	1 " necrosis,*
3 " lingual surface,	1 " inflammation of the gum,*
2 " buccal surface,	1 " abscess in the alveolus,*
2 " masticating,	1 " tic douloureux,*
" situation not noted,	1 " cases not registered,
22 " stumps only were present,	1 " the tooth was loose, and when removed found to have no fang, none having been developed.
9 " looseness occasioning irritation and pain,	

Of the 29 from the lower jaw:

In 7 cases the anterior surface was attacked with caries,	In 5 cases the stumps only remained,
7 " posterior,	4 " looseness occasioning irritation and pain,
7 " lingual,	2 " space was required for the anterior teeth.
2 " buccal,	

TABLE VI.—Of the 1736 permanent teeth extracted from all causes:

231 were SECOND BICUSPIDES: of these,	147 from the upper, and
115 were from males, and	84 from the lower jaw.
116 from females,	

Of the 147 from the upper jaw:

In 30 cases the anterior surface was attacked with caries,	In 1 case the situation not noted,
52 " posterior " "	29 " stumps,
2 " lingual " "	In these 119 cases, caries was the primary cause of the loss of the teeth.
1 " buccal " "	
4 " masticating " "	1 case tic douloureux,
15 " looseness,	1 " fracture,
1 " space,	1 " connected with dead bone,
1 " necrosis,	5 " causes not registered.
" inflammation,	
3 " abscess,	

Of the 84 from the lower jaw:

In 16 cases the anterior surface was attacked with caries,	In 5 cases the masticating surface was attacked with caries,
29 " posterior " "	14 " stumps " "
3 " lingual " "	In these 70 caries was the primary cause of the loss of the teeth.
3 " buccal " "	

* The teeth apparently sound.

10 cases looseness,
1 " necrosis,
1 case tic douloureux,
2 " for causes not registered.

TABLE VII.—Of the 1736 permanent teeth extracted from all causes:

642 were FIRST MOLARES: of these,
337 were from males, and
305 from females;
259 from the upper, and
383 from the lower jaw.

Of the 259 from the upper jaw:

In 71 cases the anterior surface was attacked with caries,
40 " posterior " "
7 " lingual " "
6 " buccal " "
75 " masticating " "
" situation disease not noted,
35 " stumps only remained.
In these 234 cases, caries was the primary cause of the loss of the teeth.

11 cases looseness, occasioning irritation and pain,
1 " necrosis of the anterior fang produced pain,
2 " inflammation of the gum, teeth sound,
5 " pain in the teeth rendered the removal advisable—teeth sound,
6 " causes not registered.

Of the 383 from the lower jaw:

In 68 cases the anterior surface was attacked with caries,
54 " posterior " "
6 " lingual " "
22 " buccal " "
177 " masticating " "
38 " stumps only remained.
In these 365 cases, caries was the primary cause of the loss of the teeth.

In 5 cases looseness, occasioning irritation and pain,
2 " pain rendered removal requisite,
1 " abscess of the alveolus,
In these 8 cases the teeth were apparently sound.
6 cases causes not registered.

TABLE VIII.—Of the 1736 permanent teeth extracted from all causes:

389 were SECOND MOLARES: of these,
195 were from males, and
194 from females;
141 from the upper, and
248 from the lower jaw.

Of the 141 from the upper jaw:

In 26 cases the anterior surface was attacked with caries,
21 " posterior " "
6 " lingual " "
12 " buccal " "
25 " masticating " "
24 " stumps only remained.
Of these 114 cases caries was the primary cause of the loss of the teeth.

19 cases the looseness occasioning irritation and pain,
1 " necrosis,
1 " abscess,
1 " pain,
2 " inflammation of gums, &c.
1 " fracture of the jaw.
In these 25 cases the teeth were apparently sound.
2 cases causes not registered.

Of the 248 from the lower jaw:

In 22 cases the anterior surface was attacked with caries,
22 " posterior " "
3 " lingual " "
45 " buccal " "
107 " masticating " "
32 " stumps only remained.
Of these 231 cases caries was the primary cause of the loss of the teeth.

9 cases the looseness occasioning irritation and pain,
1 " necrosis,
1 " pain,
In these 11 cases the teeth were apparently sound.
6 cases causes not registered.

TABLE IX.—Of the 1734 permanent teeth extracted from all causes:

176 were THIRD MOLARES: of these,
97 were from males, and
79 from females;

68 from the upper, and
116 from the lower jaw.

Of the 60 from the upper jaw:

In 12 cases the anterior surface was attacked with caries,
3 " posterior " "
1 " lingual " "
12 " buccal " "
10 " masticating " "
11 " stumps only remained.
In these 49 cases caries was the primary cause of the loss of the teeth,

6 cases looseness, occasioning irritation and pain,
1 " abscess of the alveolus,
1 " inflammation of the gum, &c.
2 " pain without decay.
In these 10 cases the teeth were apparently sound.
1 case cause not registered.

Of the 116 from the lower jaw:

In 14 cases the anterior surface was attacked with caries,
6 " posterior " "
1 " lingual " "
21 " buccal " "
40 " masticating " "
11 " stumps only retained.
In these 93 cases caries was the primary cause of the loss of the teeth.

12 cases looseness, occasioning irritation and pain,
1 " exostosis of the fangs and thickening of the jaw,
1 " the tooth decayed, and producing *tic douloureux*,
1 " abscess of alveoli; tooth sound,
3 " the teeth were developed with crown projecting forward, and producing great pain,
5 " causes not registered.

The consequences of caries are various: the disease may commence and progressively destroy the crown of the tooth, and very little pain may be felt during the process; or, it may be arrested after the destruction of the crown, and the roots of the tooth may remain in the gums, and give little or no inconvenience. But, on the other hand, pain may commence with the disease; the pulp, as the disease advances, may become inflamed, and if the tooth is not removed, the inflammation extends to the dental periosteum, and be followed by alveolar abscess: the pain all the while increasing. Not only alveolar abscess may arise as a consequence of caries, but periostitis of, and subsequent necrosis of, a large portion of the jaw. There is an out-patient attending the hospital at this time who is suffering from necrosis of the right side of the lower jaw, which was occasioned by inflammation set up by a carious tooth. Tumors of the gums may arise as a consequence of caries, as also may fungous growth of the pulp; but, as these diseases

will come under our notice at a future lecture, I need not do more than refer to them now.

Treatment of Dental Caries.—Lost vitality in a tissue we cannot restore, neither should we gain much if we could, when the loss is confined to that portion of a crown of a tooth protected by enamel, seeing that the dead part is as useful as before, supposing that it be enabled to resist decomposition. In our treatment, then, what we have to do is to enable the affected tooth to resist future chemical change, or, if partially decomposed, to replace the lost part by some substance that will itself resist the action of the saliva, and prevent it from coming in contact with and injuring the dentine; or, if the disease has destroyed the crown of a front tooth, to replace it, if required, and the root be healthy, by an operation called pivoting.

But, as the treatment will to a considerable extent be reguated by the extent and situation of the disease, it will be expedient to describe the treatment adapted to these several conditions.

Treatment of Superficial Caries.—If, then, the disease is of very small extent, and indicated by slight discoloration of the enamel, and if, on examination, by a pointed steel probe it is found to be superficial, it will be sufficient, whatever the situation, to remove the affected part by a scaulper, or file, and afterwards to well polish the exposed dentine; at the same time directing your patient to keep the surface polished, otherwise the exposed tissue will soon be decomposed by the saliva should it chance to be acid. It is no uncommon thing to find that many teeth are attacked at the same time; on inquiry, you will generally hear that your patient has acid saliva from indigestion, or has been taking medicine containing a mineral acid. In either case it will be well for the patient to use an alkaline dentifrice, and in the latter to rinse the mouth with a weak solution of carbonate of soda after each dose of acid medicine.

On attempting to remove the carious portion, however superficial and small in extent it may be, the tooth will sometimes be so tender that the operation cannot be borne: the slightest touch of the instrument is attended with intolerale pain. When-

ever this is the case, the operation should be postponed till the sensitiveness of the affected part is reduced. The most ready means of effecting this, is by rubbing powdered nitrate of silver, or any other escharotic, on the sensitive part, with the end of a piece of whalebone, or cane. Chloride of zinc is, perhaps, the best application, as the effect is speedy, and the tooth will not be discolored. The operation may then be proceeded with, and should the surface again become tender before the completion, the escharotic must again be applied. A prolonged application of camphorated spirits of wine will sometimes subdue the sensitiveness; but when the disease has attacked the exposed neck of the tooth, commencing on the surface of the cementum, a situation in which we find extreme tenderness more frequently than in any other, the camphorated spirits is difficult of continued application.

But if, instead of finding the disease superficial on examination, the probe sinks to some little depth into the tooth, indicating thereby that to that depth the dentine is deprived of its earthy ingredients, then we must have recourse to the operation of plugging. The softened dentine must be removed by conveniently shaped steel instruments. The whole of the softened tissue having been removed, the cavity must be wiped dry, and then carefully filled with some substance which will resist the action of the constituents of the saliva, and will be sufficiently hard to resist injury in mastication. Metals are the only substances found to combine these qualities. Gold, platina, tin, or lead, reduced to thin foil, and packed tightly in the cavity, forms an efficient plug: gold being the most valuable, the others following in the order in which they are placed. An amalgam of palladium or silver may be used with advantage in cases where the cavity is so situated that it becomes inconvenient to pack densely gold or other foil.

A plug is effective only so long as it perfectly excludes all extraneous matter from the cavity; thence it follows, that in order to fill a cavity with metal foil, considerable compressive force must be used. You will at once, therefore, perceive that should the caries have extended so far as to reach the pulp

cavity; though by careful management the softened dentine might be removed; yet the patient would be quite unable to bear pressure unless considerable precaution be used, even in the most favorable case; and when the surface of pulp exposed is considerable, the operation could not be borne, and if borne, would produce inflammation of the pulp. In many cases, however, your patient will not apply for relief until the disease has not only progressed to the pulp cavity, but the softened dentine removed so as to make a communication between the pulp cavity and the mouth, thus exposing the sensitive pulp to the action of the many fluids and the various matters taken into the mouth. In this case the pulp itself will be more or less diseased. The exposed surface may be inflamed, and throw off a discharge, or it may have receded partially or wholly from the pulp cavity, leaving the vacated space to be occupied by extraneous matter. So that it is of considerable practical importance to learn whether the pulp has been exposed by the removal of softened dentine during the operation, or whether it has been previously exposed. In the one case, plugging, if so managed as not to produce pressure on the nerve, may be successful; in the other, it will, if performed, be followed by ill consequences, as the discharge from the pulp will be confined, and the usual distressing symptoms, indicating pus confined in an unyielding cavity, will result. It is a very good practical rule, if, in removing the softened dentine, or in pressing a probe in the cavity, pain is felt, but only so long as the instrument remains in contact with the tooth, to proceed to plug the cavity; but, if the pain continues after withdrawing the instrument, to postpone plugging, and resort to some means to restore the pulp to a healthy condition, or to produce its destruction; for the continuance of the pain is a tolerably sure sign that the pulp is more or less involved in disease, and that if the tooth be immediately plugged that inflammation will supervene.

The diseases of the pulp, and their treatment, as also the operation of plugging, will occupy our attention on a future occasion.

LECTURE XI.

DISEASE OF THE DENTAL TISSUES—NECROSIS—EXOSTOSIS—ABSCESS IN THE SUBSTANCE OF THE DENTINE—LOSS OF ENAMEL AND DENTINE FROM THE ANTERIOR SURFACE OF THE TEETH—ABSORPTION OF THE FANGS OF THE PERMANENT TEETH—CRACKS IN THE ENAMEL—PAIN IN SOUND TEETH.

Dental necrosis, by which is meant the death of the whole or a part of a tooth, but, unlike caries, is not usually attended by decomposition of the dead tissue. When the whole of a tooth loses its vitality we have complete necrosis; when only part dies we have partial necrosis. In complete necrosis the fangs are entirely denuded of living periosteum, and the pulp dies; in partial necrosis the dead portion of the fang only is deprived of its periosteum, and the pulp of the fang in the majority, though not in all cases, dies.

The physical changes in the dental tissues indicative of complete necrosis commence with the death of the tooth, but from their slow progress some time elapses before they become discernible. The tooth gradually assumes a darker hue than natural, which increases in intensity till it is almost black. The dental periosteum gradually detaches itself from the fang, the tooth becomes loose, and, unless held in by the crooked form of the roots, drop out. The surface of the fangs are generally rough, and, near the neck, dotted over with nodules of hard green-colored tartar, while the ends of the roots often look worm-eaten, as though absorption had commenced. In some cases, where the teeth are dark and look wholly dead, and produce irritation in the alveolus, we find, on some parts of the fang, patches of newly-formed cementum, to which the periosteum is strongly attached, and the tooth is thus firmly held in its place. In these instances the death of the tooth must have proceeded gradually, and the periosteum subjected to that species of irritation leads to the formation of cementum. Dental

necrosis may result from mechanical violence, or from inflammation of the alveoli; severe salivation and fever are sometimes productive of this disease; absorption of the alveoli with advancing age may also lead to necrosis; but usually, the tooth in old age is connected with the dental periosteum, and the pulp lives till the tooth, having lost all natural support, is forced out.

The effects of death of a tooth upon the neighboring parts vary with the nature of the producing cause; if a severe blow be the cause, the inflammation consequent upon the injury done to the tooth and alveoli will be acute, and if not wholly caused, in the first instance, by the death of the tooth, but arises from the injury the parts have conjointly received, will be kept up and even extend so long as the tooth is allowed to remain. But if, on the other hand, the dental necrosis be the consequence of a slight blow, or result from any deranged state of the system, the gum and alveoli may become but slightly inflamed and thickened; pus will be discharged from the alveolus, and cease only with the removal of the tooth; whether this be effected by extraction or by absorption of the alveoli and consequent extrusion of the dead tooth.

Mr. Fox in his practice attempted to save teeth where the pulp was exposed and painful, by carefully dislodging the affected teeth from the alveoli, and thus breaking off their connection with the nervous system. In some cases the experiment was successful, the tooth reunited to the periosteum of the alveolus, but in the great majority of cases it did not reunite, and the tooth then, of course became dead. In narrating these cases he gives an excellent description of the effects of sudden and complete necrosis of a tooth upon the alveolar periosteum. He says, "the method I adopted was to raise the tooth, by the common operation of extraction, so high in the socket as carefully to break the nerves and vessels which enter the extremity of the fangs: then, in withdrawing the force, to put the tooth back again into its former situation. I not only recommended this operation, but performed it upon a great number of persons, and for a short time, flattered myself with very sanguine expectations;

these, however, were gradually destroyed, for some of my patients, in about three or four weeks, came complaining of pain, and were anxious to have the tooth completely removed. They did not suffer the tooth-ache so acutely as before, but the tooth had become loose and was protruded from the socket, so that whenever the mouth was closed the pressure of the teeth of the other gum against the tender one occasioned great pain. On extracting these teeth I found the fangs covered with a considerable quantity of coagulated lymph." I have seen many cases, where teeth, dislocated from a fall, have been returned to the alveoli, but could not be retained; if they are speedily removed we find a coating of what Mr. Fox calls coagulated lymph, but if allowed to remain a little longer, the lymph is replaced by, or infiltrated with pus.

The consequences upon the neighboring parts, when necrosis occurs without previous absorption of the alveoli, and the tooth is allowed to remain, are often more serious than those I have at present noticed. The periosteum of the alveoli becomes inflamed together with the neighboring parts: if the case be still neglected, the adjoining teeth are not unfrequently lost, and necrosis of a considerable part of the jaw may also result, Cases of this serious description sometimes come from a blow, but occasionally result from alveolar inflammation. Should, however, the inflammatory action be less severe, the gum and alveolus of the dead tooth may alone be affected; the tooth will then become gradually loose, the gum will be inflamed and thickened, and pus will be discharged from between the tooth and alveolus whenever the gum is pressed: this continuing, the tooth becomes more loose, and at last falls out, and the gum resumes a state of health. In teeth where necrosis has been gradually produced the tooth is generally wholly deprived of periosteum: when the death has been the result of violence, or of active alveolar inflammation, you will, on removing the tooth, find shreds of dead periosteum, infiltrated with pus, adherent to the surface of the fang. In partial necrosis of teeth the extent of the disease may be very limited, or the greater portion of the tooth may be involved; but, whether the extent

be great or small, the necrosed portion is deprived of periosteum, and presents, on examination, a more or less rough surface. Whether or no the dentine be discolored will depend upon the situation of the necrosed portion. Thus, instances are not uncommon when the pulp of the tooth has died while the external surface of the fang has preserved its vitality. In these cases the dentine becomes discolored, and gives a general dark appearance to the tooth. On the other hand, nothing is more common than necrosis of the extremity of the fang while the remaining portion of the tooth retains its vitality; but here we find no discolorment, though the extent of the necrosis is clearly marked by the adhesion of the periosteum to the living portion, and its separation from the dead portion of the fang. In all cases of partial necrosis where the neck of the tooth retains its periosteal covering, with which I have become acquainted, the separated periosteum forms a sac round the dead dentine, the inner surface of which sac secretes pus, and, in fact, forms the coat of an abscess. Partial necrosis seems generally the result of inflammation of the dental periosteum or of the pulp, and may be situated in any part of the tooth, but it is far more common to find it about the apex of the fang, resulting from inflammation of the periosteum communicated by inflammation of the pulp. But instances are not very rare in which the necrosed portion occupies a circumscribed spot on the fang, or below the fang, of a molar tooth. The following is generally typical of such cases. A male patient of twenty-eight, applied to have a tooth removed, in consequence of severe pain. On examination, the tooth, a first molar of the upper jaw, appeared perfectly sound and healthy, but the gum was inflamed opposite the root of the tooth. The gum was lanced, a little pus escaped, and the pain ceased. In a short time the patient again applied, for relief from severe pain in the same situation, and insisted on the tooth being removed. He said that excessively severe pain had, at short intervals, attacked this tooth, and though, generally, reduced by lancing the gums, yet the inconvenience was too great to be endured for the sake of the tooth. On removal, a circumscribed spot of necrosed

dentine was found between the fangs, from which the periosteum had separated and dilated, thus producing absorption of the alveolus between the fangs. The so-formed sac was full of pus: the tooth was otherwise healthy, and of good color. Whether inflammation of the periosteum, and consequent separation, was the primary condition, or whether necrosis was the first abnormal state, would be difficult to determine, but that the necrosed condition of the dentine was the cause which kept up the diseased state of the periosteum admits of no doubt.

Towards the middle or later period of life, the molar teeth are occasionally rendered painful and useless from necrosis of one of the fangs. I will recite a case that recently occurred to me. A male patient, aged 48, applied to be relieved of a troublesome tooth, of which he gave the following history. Twelve months since the tooth became slightly uneasy on contact with hot or cold fluids; after a while he discovered that it was slightly loose; still mastication produced little or no pain. The inconvenience gradually increased, till at last severe pain was felt whenever fluid differing in temperature from the mouth came in contact with the tooth. Pain, too, was occasionally produced by mastication. On examining the tooth—a second molar of the upper jaw—about the crown no morbid appearance presented itself, but the inner fang seemed more exposed at its base than usual. The gum about it was a little thickened, but not inflamed; a probe, however, could readily be passed down into the socket without meeting any obstruction: this at once proved the fang to be necrosed. The tooth was removed, and the inner fang was removed, and the inner fang was found to be perfectly unattached, was rough and discolored. The two external fangs were healthy, and the tooth in no part carious. Had this tooth been allowed to remain, the process of absorption of the alveolus and gum of the affected fang, which had already commenced, would have gradually advanced, and the fang in the process of time would have been left exposed in the mouth. The case I have detailed to you is not in any way peculiar; it is, in fact, a specimen of a very common complaint, the only remedy for which is extraction of the tooth. In these cases

the pain felt on the application of hot or cold fluids is, I believe, seated in the alveolus occupied by the dead fang, which, being unattached, not only prevents the alveolus from filling up, but allows foreign matter to get into it, and keep up irritation, as well as producing irritation itself. Distinguished from total necrosis of a fang is death and discoloration of one side only: we have occasional opportunities of seeing in the molars of the upper jaw, the lingual side, or the buccal side of the gum and alveolus, completely absorbed, leaving the fangs completely exposed in their whole length, while those surfaces of the fangs which are opposed to each other are strongly attached to the periosteum and to the alveolus, which lies between the fangs. In these cases but little uneasiness is felt; the teeth remain useful to the last.

There is yet another form of partial dental necrosis: the pulp sometimes dies, and with it the surface of the pulp cavity, while the outer surface of the fang retains its vitality. The tooth, in this case, gradually darkens in color, but the periosteum remaining healthy, the tooth is retained, and may be useful for years. On the other hand, the periosteum may be slightly affected and yet practically give no inconvenience to the patient. Such teeth are usually retained, and continue useful for an indefinite period. But, unfortunately, the periosteum of alveolus, and of the tooth, continuing in this state, is rendered very liable to inflammation, which, on its occurrence, renders the removal of the tooth imperative. In the operation of pivoting, or grafting, as it is sometimes called, the crown is removed, while the fang is permitted to remain in the gum. The pulp of the fang is destroyed by a fine steel probe, and the cavity enlarged to hold a piece of gold wire, to which is attached the crown of a foreign tooth. Here we produce death of the pulp, and hence necrosis of the inner portion of the fang. The external surface of the fang may, and does, in the majority of cases, remain healthy, though in a few individuals, unfortunately, the opposite result occurs. The fang becomes necrosed, the periosteum inflames, and the fang would be eventually dislodged, but that the degree of risk of more extensive mischief

and of suffering, from the inflammation of the surrounding textures, renders the removal of the fang necessary long before nature could have completed her process of extrusion.

I shall describe several cases in which serious consequences followed the operation of pivoting, when we come to the consideration of that subject.

Dental Exostosis, or Hypertrophy of the Cementum of the Fang.—It will not be forgotten that the surfaces of the fangs of teeth are coated with a thin layer of cementum. Under certain circumstances this layer becomes increased in thickness by additions on the external surface. The newly added cementum is in every way similar in structure to that previously forming part of the tooth.

You have learned from your pathological lecturer, that a natural tissue increased beyond the natural amount constitutes a disease, by changing the size and figure of the affected organ, and hence encroaching upon neighboring parts. When the cementum of the tooth becomes developed in an unnatural degree, the form of the tooth becomes changed, and we have exostosis. With the increase of size in the fang of the tooth there must be a corresponding increase of capacity in the containg alveolus. In dental exostosis the amount of new cementum may be very slight, or it may be considerable in quantity. The affected fang may be but slightly enlarged, or it may be increased to twice its natural size. Near or about the end of the fang is the most common situation to find the greatest amount of cementum: but you seldom find an increase on one side of the fang only, unless the opposite side has been exposed by the absorption of the gum, or deprived of its periosteal covering. It is not rare to find the thickening commence abruptly above the necrosed extremity of the fang usually present in chronic gum-boil. You will also find cases in which the dentine of a fang has been necrosed, and the fang itself been thrown up and lying in its length on the surface of the gum, held in that situation by a patch of new cementum, which has been deposited on and is adherent to the stump. The periosteum of the new cementum then connects the stump with

the gum. A short time since, a patient applied to have the fang of a second bicuspis removed. She stated that she had suffered a great deal of pain, which, commencing in the tooth, extended to the side of the face and the head. The pain was remittent, lasting at one time for many hours, at another time only for a few minutes. It was not until after several attempts had been made, and with the application of considerable force, that the removal of the offender was effected. There was great exostosis, and the difficulty arose from the fang near its extremity being twice the diameter of the neck, where it was closely embraced by the alveolus. The surface of the hypertrophied part, like that of other teeth similarly affected, was smooth, but pitted, unlike the smooth and even surface of the fang of a healthy tooth. The orifice admitting the vessels and nerves into the pulp cavity, small in the healthy tooth, is comparatively large in the new cementum of exostosis, and its edges are rounded. Dental exostosis is caused by that condition of the periosteum which is called irritation—a state usually induced by pre-existing disease in other dental tissues, and, in a great majority of cases, by caries: not always, however. In the specimen before you, from which the figure has been taken, the tooth appears, in all respects, healthy, excepting the exostosis of the posterior fang. In bones we find exostosis situated in the immediate neighborhood of inflamed parts. It is also exceedingly common about the sheaths of the tendons of the fore-legs of horses subject to be rode at a fast pace on hard roads, whereby the feet and legs become injured, and often slightly inflamed, and is called a *splent*.

The fangs of teeth that have been pivoted are very liable to exostosis, and with it thickening and increased vascularity of the gum belonging to the tooth. In teeth connected with chronic gum-boil from necrosis of the extreme end of the fang, exostosis of the upper part of the fang is very common.

In all these instances we find hypertrophy of the cementum brought about in or by the vicinity of diseased action.

The *symptoms* of dental exostosis are not in all cases sufficiently distinct from those indicating other diseases to enable

the surgeon to recognise the exact nature of the malady. When fangs that have lost their crown by caries are subject to this disease, the gums are usually thickened, are of a deep dull red color, and bleed readily. The surface of the gum is sometimes smooth and shining; at others is rough and granulated, and the edge, instead of becoming gradually thinner to its termination on the neck of the tooth, ends by a thick, broad, flat edge, in which change of form the edge of the alveolus also participates. The condition of the gums I have just described is very commonly seen when the incisores of the upper jaw are affected with exostosis, and I have observed is frequently confined to the anterior or labial surfaces, while the surface of the gums within the mouth are comparatively free from disease. We may, however, have exostosis without any disease in the gums. Pain is not a constant attendant on exostosis, though in most cases it is occasionally present, and when present, is generally of a gnawing character. In cases of sympathetic affections induced by dental exostosis, pain in the affected teeth, so far as my experience goes, is very commonly absent.

Of the various dental maladies, exostosis is the most frequent source of sympathetic disorders. The affections so induced are usually confined to functional derangement of the whole nervous system, or the nerves of some particular part.

I need not do more than remind you that, in whatever part of its course a nervous fibre be subject to irritation, the effect produced by that irritation, whether it be suspension or derangement of function, will be felt in the part to which the nerve is ultimately distributed, and that you may or may not have pain in the part where the irritation is applied. Again, if the whole or part of the nervous system be predisposed to any special disease, irritation applied to any set of nerves may induce that disease, the degree of irritation being wholly insufficient to excite the sympathetic malady had there been no predisposition. Thus, diseases of the teeth will occasionally produce epilepsy where there is a predisposition to that complaint. Tic douloureux is also sometimes brought on by the like cause. The following case will illustrate the point under consideration: A lad,

a farm laborer, from Windsor, was admitted into the hospital for epilepsy. The usual remedies were tried for six weeks without effect. His mouth was then examined, and the molar teeth of the lower jaw were found to be much decayed, and of some of these the fangs only remained. He did not complain of pain in the diseased teeth, or in the jaw. The decayed teeth were, however, removed, and the fangs of each were found to be enlarged and bulbous from exostosis. At the expiration of eighteen months he had not had a single fit since the removal of the diseased teeth, though for many weeks previous to the operation he had two or three per day. This is a case of singular interest, inasmuch as there was no complication of maladies, and hence there could be no doubt as to the cause of the disease, seeing that it immediately subsided when the teeth were removed; and it is further useful, in showing that a sufficient source of local irritation to induce functional derangement may exist without pain being felt in the part where the irritation is applied.

A similar but less marked case occurred shortly afterwards in the person of a policeman. He had fits, which were greatly relieved by the removal of the inferior wisdom tooth, the subject of exostosis.

Vague and shifting pains about the head and face, and sometimes even in the neck and shoulders, are not uncommon consequences of dental exostosis. Tic douloureux is also sometimes induced by the like cause, though much less frequently. I have seen tooth after tooth removed for the relief of tic, where no benefit has followed; but, on the other hand, several cases have come to my knowledge where the pain gradually diminished from the time the teeth were extracted, and shortly wholly subsided. I should here remark, that, when pain has become periodical, and has existed for some time, the attacks will not necessarily cease immediately, the cause which originally produced them has been removed; on the contrary, they frequently appear for some little time afterwards, but in each successive attack the pain diminishes in intensity, and at last ceases. I have observed that the removal of a tooth which has occasioned

sympathetic pain almost always produces a severe paroxysm of the sympathetic pain, and that the paroxysm will bear some relation in duration and intensity to the previous attacks. In accounting for the production of these sympathetic maladies, I must beg you for a moment to bear in mind, that a sympathetic affection in one part is a consequence of organic or functional derangement in some other part of the body, but for which the sympathy would not exist. The most familiar example illustrative of the point is, perhaps, the pain felt in the shoulders when the functions of the liver are deranged. It is not in all cases very easy to see why, when we have diseases in one part, we should also have pain in another, the parts being apparently disconnected, and at some distance from each other; and it is still more difficult to see why the sympathetic pain is not constant in all similar cases of the primary affection. Anatomical examination will, however, enable us to understand how many sympathetic affections may arise from dental disease.

Now you are well aware that some tissues, and especially bone, are absorbed, and make way for a growing tumor, and that the process is pretty generally unattended with pain. Not so, however, with the larger trunks of nerves: they, instead of being absorbed, are pressed before a growing tumor, become strained, and hence there is pain or suspension of the nerve's function, either in the part itself, or in those parts to which the nerve is ultimately distributed. The trunks of the dental nerves contain many fibres that are to be distributed to other parts than the teeth.

Bearing, then, these facts in mind, we can at once understand that, if the extremities of the fangs of a tooth be but slightly increased in size, whether by hypertrophy of the cementum or by the growth of any other tumor, the dental nerve may be thereby disturbed, and hence sympathetic pains may be induced in any of those parts with which the nerve is connected. These interesting physiological points will, however, be brought more fully under your notice in other lectures than those on dental surgery.

LECTURE XII.

DISEASE OF THE DENTAL PULP—IRRITATION OF THE DENTAL PULP—CAUSES AND TREATMENT—INFLAMMATION, GENERAL AND PARTIAL, OF THE PULP—CAUSES AND TREATMENT.

Diseases of the Dental Pulp.

THE dental pulp, composed of vessels, nerves, and the remains of the formative tissue, is, like other vascular textures, liable to irritation, to inflammation, and its events. These, in their various forms and consequences, it will now be our business to trace.

Irritability of the Pulp.—By irritability here is meant, an increased susceptibility to pain and to morbid action, unattended with organic change. A cause productive of no inconvenience in a healthy tissue will in an irritable one induce pain and increased action, and, if long continued, inflammation, and its various results. The most frequent cause of irritability is caries, immediately prior to its laying open the cavity. When a tooth is in this state, the pulp, having its natural defence much weakened, is, consequently, much exposed to sudden changes of temperature, and also to the contact of the fluids of the mouth, by their oozing through the diseased or disorganised dentine. Hence the pulp becomes irritable; so that when hot or cold, or sweet or acid matters are taken into the mouth, and come upon the tooth, a more or less severe twinge of pain is felt, which may last but for a moment, or may continue for some minutes, and then subside, the time varying in each case with the degree of irritability of the pulp. Again, if the pulp or periosteal membrane of a tooth be inflamed, the pulps of the neighboring teeth may become highly sensitive, and even painful, and, consequently, unfitted for use. Sometimes pain in one tooth will be followed by pain in the corresponding tooth of the opposite side, and even of the opposite jaw; indeed, occasionally disease of a pulp itself, unattended with pain, will induce

pain in the pulp of another perfectly sound tooth. In these cases we can explain the irritation produced in neighboring teeth only on the supposition that the nervous fibrils destined to be distributed to the affected tooth are irritated in their passage past the pulp that is really diseased. Irritation of the dental pulp terminates in one of three ways:

First, the cause being removed, the irritation subsides, and the pulp returns to health, as instanced where a tooth with an inflamed pulp has been extracted, other teeth that have been affected by it become again healthy. Again, a tooth irritable from incipient caries becomes healthy after the cavity has been plugged.

Secondly, the pulp may become converted into dentine opposite the point from whence the source of irritation acted, and thus form a barrier for itself against the ingress of the irritating agent. We see instances of this event of irritation in cases where the pulp is converted into dentine opposite a point from which a portion of the enamel and of the dentine composing the crown has been removed by wear, by fracture, by the use of the file, or even by caries.

Indeed, if the pulp of a tooth extracted for caries and subsequent odontalgia be carefully examined, there will, with a few exceptions, be found more or less calcification near the point towards which the disease had advanced.

Thirdly, the irritation may terminate in inflammation and suppuration of the pulp. This result usually follows long-continued irritation, arising from a local cause, as caries, or simple fracture of a tooth.

Treatment.—Where one tooth is rendered painful in consequence of disease in another tooth—that is, is sympathetically affected—the treatment must be addressed to the primary offender, the cure or removal of which will be followed by the subsidence of the irritation of the one sympathising. Should, however, the irritation have a local origin, and arise from loss of substance in the crown of the tooth by caries, the tooth should, without delay, be carefully plugged with gold or other stopping; the irritating agents will then be hindered from filtering through

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upon the pulp; and though the metal used for plugging transmits changes of temperature more readily than the sound portion of the tooth, yet the pulp soon becomes inured to this source of irritation, or shuts it out, by calcifying opposite to the plug—an event very desirable in all such cases. A sudden change of temperature, especially from hot to cold, will, in most teeth that have been recently plugged, supposing the plug to be of any size, produce sharp pain for the moment. The paroxysm of pain, however, quickly subsides, and, after a while, cannot be reproduced by a similar cause.

If the loss of substance in the crown arises from fracture, time, with the application of astringents to the exposed and sensitive dentine, together with a careful avoidance of unnecessary sources of irritation, will effect the cure. If the crown has suffered from undue wear, similar treatment should be pursued, with a more careful use of the teeth. If the bicuspides or molares are reduced to this state, a cap of gold may be fitted to them, on which the patient may masticate for a time. Should this, which is often a most serviceable plan, be adopted, the cap must be removed several times in the course of the day, and the tooth or teeth carefully brushed: it must also be left off during the night, otherwise the teeth may become the subjects of caries.

Inflammation of the Dental Pulp.—The pulp, in common with all vascular tissues, is liable to inflammation, and, like those which are confined in an unyielding case, is the seat when inflamed of violent throbbing pain. We are most of us pretty well acquainted with the sensations which accompany inflammation of the dental pulp, seeing that that condition is, in nine cases out of ten, the cause of tooth-ache.

The structural and physical changes of texture that accompany or constitute inflammation are very much the same, whatever soft tissue may be the seat of the disease. I need not, therefore, occupy your time in a minute description of these, but shall content myself with noticing those appearances that generally accompany inflammation of the dental pulp. The possibility of swelling is precluded by the dense case in which

the pulp is contained, unless this is somewhere imperfect, and then the enlargement can only occur at that point. Redness is, however, always present, and is occasioned by an increased size of the capillaries; these vessels, invisible to the naked eye when healthy, become very apparent under inflammation. The healthy pulp is a very light pinkish grey, but an inflamed pulp is bright scarlet. The best method of getting at the pulp for examination is to screw the body of the tooth in a vice till it breaks. The broken pieces may then be carefully removed, and the pulp examined. This plan is preferable to sawing through the tooth, for then the saw-dust gets upon the diseased part, and obscures the view.

The whole of the pulp may be involved in disease, or only a portion, the amount chiefly depending upon the nature of the producing cause, or, in other words, there may be *partial* or *general* inflammation of the pulp. Thus, if the pulp cavity be entire, and the pulp be subjected to prolonged irritation, the whole substance of the organ will become inflamed; on the other hand, if an opening has, from any cause, been made into the pulp cavity, the disease may be confined to that part situated near the opening. It is not difficult to conceive why this should be, when we consider that in the latter case the surface subjected to the direct action of the irritating agent will be confined to that exposed by the opening; and, further, that any discharge poured out from the inflamed part will find a ready passage for escape, and hence produce no direct influence upon the unaffected part of the pulp, whereas, had the pulp cavity been entire, any swelling of or discharge from one part of the pulp finding no escape, would press equally on all parts, and thus the whole organ would become involved in disease. Again, the inflammation may be general and acute, and speedily terminate in the destruction of the pulp, or, on the other hand, it may be chronic, and the pulp may, under disease, retain its vitality for a considerable time. The degree of the inflammation will depend upon the character of the producing cause, upon the previous state of the pulp and of the walls of the pulp cavity, and also upon the state of the system at the time of the attack. If

the pulp has been rendered irritable by gradual thinning of the walls of the cavity, the inflammatory action will probably be general, and terminate in destruction of the part, as illustrated in the following case.

A short time since, a patient applied for treatment who stated that she had suffered severe throbbing pain in a first molar of the lower jaw for two days, that the pain, at first slight, had gradually increased in intensity, and that the adjoining teeth had now become tender, so that the mouth could not be closed without pain. The aching tooth had suffered from superficial caries of the masticating surface, which disease had thinned the walls, but had not made an opening into the pulp cavity. After removal, the tooth was very carefully examined, and the cavity found to be perfectly entire. The pulp had been inflamed, was dead, offensive, and bathed in pus, as ascertained by the microscope, while in its substance a few small nodules of dentine could be distinguished. The periosteum of the tooth was becoming slightly affected about the extreme point of the fang. This case presents no peculiarities, but is on the contrary typical of general and acute inflammation and subsequent suppuration and death of the dental pulp, arising from prolonged irritation, caused either by irritating fluid oozing through the thinned wall of the pulp cavity, or by sudden alternations of temperature arising from the same cause. A similar state of disease not unfrequently comes on from exposure of the pulp by caries; in such cases the inflammation commences at the exposed point, and extends to the rest of the pulp. Another cause not unfrequent among the more wealthy, is the closure by plugging of a carious opening through which a small portion of discharge thrown off from the exposed portion of the pulp had habitually escaped. Compression of the pulp by the bending or bulging inwards of the softened or thinned wall of the cavity, or mechanical injury from any cause, is also an occasional excitant of general inflammation. The pain attendant upon general inflammation of the pulp mostly commences with slight gnawing, which gradually increases and becomes throbbing, and lasts till the pulp is destroyed. The pain then ceases or is

altered in character to a dull heavy pain, and at this period the side of the face very commonly becomes more or less swelled and œdematous. This change of symptoms indicates that the pulp has been destroyed, and the occurrence of dull heavy pain, that the periosteum has become the seat of inflammation. Supposing, however, the inflammation to have resulted from compression, then the pain will of course set in suddenly. If, again, the general is the consequence of previous local inflammation, as the one is a mere extension of the other, the exact period of change cannot be declared. General inflammation, when there is no outlet from the cavity, excepting through the fangs, unless arrested at an early stage, terminates in suppuration and death of the pulp. If there be an opening into the cavity the inflammation may, perhaps, partly subside, but the pulp seems never to return to a state of health. Again, if the inflammation result from exposure from fracture of the crown of the tooth, destruction of the pulp is the usual consequence.

The consequences of general inflammation of the dental pulp that may be entailed on the neighboring parts are numerous and varied. The violent pain may cease and the face swell, the swelling may subside, and the tooth lose all tenderness: the patient soon forgets the attack, but if the tooth be examined it will be found to have assumed a greyish hue, thereby indicating that the dentine of the pulp cavity is necrosed, and that the tooth holds its vitality from the periosteum alone. The tooth, however, may remain useful for years; hence, this is the most favorable result of general inflammation of the pulp; but unfortunately it is a rare one. It is far more common for the inflammatory action to extend to the periosteum of the fang, and thus induce death of the end of the fang and consequent gum-boil. Indeed, the disease may not stop here; the maxillary periosteum may become inflamed, and lead to necrosis of a large part of the jaw. Two cases in which this has occurred are now in attendance at the hospital.

Treatment.—Inasmuch as the pulp very rarely becomes the subject of general inflammation unless the crown has been previously injured, either by caries, wear, or mechanical violence,

it will be better to remove the tooth at once, rather than to endure the pain that would be consequent on its continuance, and run the risk of injury to the neighboring parts; unless, indeed, it be a front tooth of the upper jaw, where, in some patients, it is desirable to preserve the fang for pivoting; in that case the crown only must be cut off and the pulp destroyed. If the disease has resulted from plugging, the plug should be immediately removed, by which measure if the pulp itself is not saved, yet the disease will possibly not extend to the periosteum of the tooth. Several years since I had a tooth plugged; the cavity was occasioned by caries, and the pulp was exposed at one point, but whether before or during the operation I could not tell. I experienced considerable pain at the time, but within an hour the tooth became quite easy; for two months I had no pain or uneasiness, but at the end of this time a gnawing pain commenced, which gradually increased and became throbbing. At the end of twelve hours from the commencement of the pain I removed the plug; the pain ceased within a few minutes, and the mouth was filled with a most disagreeable fetid taste. On subsequent examination it was found that the body of the pulp had perished, while that occupying the fang had survived.

I have found in practice that it is far from uncommon for a tooth plugged after the pulp has been slightly exposed, but previous to pain being suffered, to answer for one, two, or even three months, and then to be attacked with inflammation of the pulp; thus obliging the removal of the plug or the extraction of the tooth. In practice, therefore, whenever you find a plugged tooth attacked with gradually increasing pain, the plug should be immediately removed; then, if the pain ceases and the tooth be of any service, it may be retained. In such case the cavity should be filled daily with cotton wool, saturated in a solution of mastic in spirits of wine; this makes a good temporary plug for the exclusion of food, and may be used till the tooth will bear a more permanent stopping.

ARTICLE II.

Observations upon the Importance and Value of a Knowledge of the Collateral Branches of Medicine and Surgery, in connection with Dentistry. By James Robinson, D. D. S., London.

(Continued from page 119.)

Having in our last paper shown the value and importance of pharmacy, chemistry and comparative anatomy to the dentist, and, we trust, proved how essential a knowledge of these subjects is to the scientific, if not the (pecuniarily) successful practice of his profession, we shall, in this, address our observations to a subject of paramount importance, surgery, both theoretical and practical.

The proper meaning of the term surgery is a matter of some dispute. By some it is considered to mean merely the mechanical part of physic, and that it should be confined to external and tangible affections, whether proceeding from disease or accident; but were surgery limited to this definition, cases of stone, and many others strictly surgical, would be excluded; while, on the other hand, if we take it to apply to all diseases involving a change in the organic structure of the parts, diseases of the liver and lungs, indeed, all organic diseases, in which a pathological change may be produced, would come under the care of the surgeon.

The fact, however, is, that the line of demarcation between surgery and medicine is so slight, and so difficult to be defined; the intricacies involved, so insurmountable by demonstration, that as regards the practice of the two arts, the distinction, if such there be, is, in most cases, made dependent on the convenience of the public and the inclination of the practitioner.

Nor could it well be otherwise in cases of affections of the liver; for instance, the disease may or may not involve a change of structure; if it does not, it may be, strictly speaking, said to be within the pale of medical treatment; if it does, and an operation be necessary, it at once becomes a surgical case; the same

holds with respect to ascites, and twenty other complaints, in which, if the medical treatment be unsuccessful, an operation is the inevitable result.

We shall, however, take a modified view of the subject, and consider surgery to include all cases of disease or accident in which there is a change in the position or structure of the parts, not produced by constitutional disease; though, in many cases, they may produce it; but even by this arrangement the same diseases may, under different phases, become the legitimate subject of either medical or surgical treatment, or, more frequently, of a conjunction of both; thus, a case of paralysis or appoplexy produced by external violence would naturally fall under the care of the surgeon, while, if its origin were more obscure and dependent on constitutional derangement it would be confided to medical treatment.

Whatever we define surgery to be, or however we limit its application, one thing is self-evident, that a knowledge not only of anatomy, physiology and pathology, but of all the other sciences connected with the medical art generally, is essential to its scientific practice, and that whether its object be confined to a particular part as the teeth or the eye, or whether practised generally; for surgery cannot be so completely separated from medicine but that cases will arise in which an acquaintance with one or more of these sciences is not imperative, nor can the dental art more particularly be considered independent of the science and resources of surgery; for, however custom may have sanctioned the different divisions and sub-divisions of the medical art, they are all, more or less, subject to the same general principles, and the same amount—though not, perhaps, precisely the same amount—of knowledge can only insure their successful practice, and any difference that exists is more in detail than in theory. It is not necessary to the dentist, for instance, to perform the operation for lithotomy adroitly, or for the surgeon to be an expert tooth-drawer, but they should both possess a knowledge of the morbid actions that may give rise to the one operation or the other.

While, however, theoretical surgery demands a knowledge

of the various sciences connected with medicine, this knowledge will be, comparatively, useless in the operative and practical portion of the art, unless the practitioner have such an amount of mechanical knowledge as will enable him to use his mechanical means in the most expert manner, and thus, as in the case of operations, lessen the time and consequent suffering to the patient.

We must not, however, be supposed to mean that lower order of mechanical tact found in the joiner or the wheel-wright; but rather those principles of animal and surgical mechanics—by means of which a dislocated arm may be reduced, or a distorted spine treated in the most scientific, and, at the same time, most successful manner; and this involves not only the selection of the best mechanical means to be employed, but the most adroit mode of using them.

Every one at all conversant with the subject, must have observed the difference exhibited by various surgeons in this branch of the art; one, for instance, performing the operation of lithotomy in two or three minutes, while another, under, perhaps, more favorable circumstances, will consume three times that amount of time. Another, reducing a dislocated arm with a tact that appears all but miraculous to those who, from want of knowledge or want of practice, have not the same facility; and which can be acquired only by an intimate acquaintance with the anatomical structure of the parts, and a thorough knowledge and perfect management of the mechanical means employed.

If, then, it is essential to the practitioner of general surgery, who, comparatively, is seldom required to exercise his skill as an operator, to acquire this mechanical knowledge and practical skill, how much more so must it be to the dentist who is hourly called upon to do so, and who, unlike the surgeon, has not time to think over and prepare for his operations perhaps days before they are to be performed, but must, in most cases, be prepared to act with off-hand promptitude.

How often is he called upon to regulate the teeth by extracting those which, by offering an opposing force, prevent the se-

ries from presenting a regular and agreeable contour; cases in which a *mistake* either in mechanical principles or physiological resource might entail permanent deformity on the patient. How often has he to treat alveolar abscess arising from the exposure of the nerve of a carious tooth. How frequently to puncture the antrum highmorianum, an operation requiring anatomical knowledge, mechanical resources, and practical skill.

All these cases require a knowledge of mechanics, and great manual dexterity, not that kind of mechanical, or rather handicraft skill of which we shall have to speak, and which is exemplified in the making artificial teeth, &c.; a branch of an infinitely lower grade than operative mechanics, inasmuch, as in the latter, anatomy, physiology, and the general principles of medicine and surgery must be brought into play before the application of the instrument to be employed.

But while a knowledge of mechanics is essential to the proper performance of operations, it would be worse than useless, unless accompanied by an adequate acquaintance with surgery and physiology. Were operations rudely performed, without reference to the powers of nature, or the resources of art, however great the manual tact of the operator, irremediable injury might be done, and cases of really slight importance converted into one of permanent deformity.

In treating of mechanics, however, it is not our purpose to divide the subject into endless ramifications of the different meanings and acceptations of the word, but to confine ourselves to those divisions more particularly applicable to dental surgery.

A knowledge of what we shall call animal mechanics, then, is as essential to the dentist as to the surgeon, and, although, perhaps, in their particular application may, generally speaking, be confined to the mouth, there is not a part of the human body, an accident to which it may be exposed, an action it may perform, or any professional service rendered it, that does not afford an illustration of some truth on natural philosophy, add to our stock of information, or from which we cannot make some deduction applicable to dental surgery.

How, for instance, could the dentist arrange with scientific certainty a set of artificial teeth, unless perfectly acquainted not only with the mouth itself, but the mechanism by which the jaws are separated or brought into contact? Thus, the lower jaw forms a lever, acted upon and moved by different muscles; the temporal and masseter muscles pulling almost directly upwards, or at right angles with the jaw, are antagonised by the digastricus and others, which assist in separating the lower from the upper jaw. We know, however, that muscles act more strongly in proportion to the straightness of their action, and less so in proportion to its obliquity, and hence, while the muscles that pull up the lower jaw exert an immense force, as may be proved by placing a substance between the more backward teeth and putting them into action; those which relax the jaw are far less powerful, and, consequently, exert a comparatively trifling amount of force. In the lion, the tiger, and the shark, the temporal and masseter muscles are still more strongly developed, and they can, consequently, crush the hardest substances without any apparent effort.

But the teeth themselves are an important consideration among the different parts of which the human body is composed, and are at the same time one of the most beautiful exemplifications of mechanical arrangement, appearing as if, severally, the fruits of distinct and miraculous agency, for it is difficult, however conversant with physiology, to imagine, how they should be formed by the laws which regulate production, or how the variety of form so beautifully adapted to the purposes for which they are intended, should be almost invariably exhibited, and thus, whether we consider the teeth themselves, or the means by which they are fixed and retained in the jaws, they are objects at once of interest, curiosity and wonder.

They may be said to constitute an extraordinary set of chisels, wedges and mill-stones, so arranged as to be most efficient for the different purposes of cutting, tearing and grinding, possessing, externally, extreme hardness, and yet having an internal organization, equal in importance and extent to that of the eye or ear, and the same powers of vitality, although their uses are purely mechanical.

It is from these circumstances, that a knowledge of the different medical sciences is essential to the treatment of these organs, and that this must be combined with an acquaintance with the mechanical laws that regulate their action when in use, and the method of supplying artificial substitutes when they are destroyed by disease or accident.

This branch of mechanics, as we before observed, differs from the handicraft of the profession, as shown in the formation of artificial teeth. The first constituting surgical mechanics, and embracing the different operations of stopping, scaling, extracting and filing, and regulating the natural teeth, or arranging artificial substitutes; while the latter, a lower branch, involves the manipulation or manufacture of the machines to be employed, such as casting models and making teeth, and adapting them to the models, making drills, &c.

From these observations it must be clear that the dental art, in its perfection, is the beau ideal of pure mechanical surgery; that its connections with mechanics are two-fold, theoretical or animal mechanics, the principles of which, when established in the mind, will be cultivated by the practice of the art, and practical mechanics, or the art of operating; and, as a celebrated writer has observed, "no art is perfect unless another art of constructing the tools necessary to the purposes of the art is embodied in it." We may add a third branch of mechanics to the two former.

The successful application of these different branches of mechanics will, of course, depend on a knowledge of these general principles, and on their especial application in practice, conjointly with mechanical ability, are an efficient knowledge of medicine, will greatly depend the success of the dental practitioner.

However much the ridicule that it has been attempted to throw on the mechanics of the profession, by some individuals possessing neither a knowledge, nor the ability to attain or apply it, we should say that a practitioner unacquainted with the laws or resources of mechanics, may be qualified to practice as a *physician* dentist, but can never, under any circumstances, fill even a mediocre position as a *surgeon* dentist.

It is clear, then, that dental surgery demands a combination of the entire branches of knowledge connected with medicine and surgery, and that, although differing from its parent stem, as to its field of action, there is no sphere in which definite and surgical mechanics can be so advantageously employed as in connection with the teeth and mouth.

ARTICLE III.

Irregularity of the Teeth. By J. TAFT, Surgeon Dentist, Xenia, Ohio

THE proper treatment of irregularity of the teeth is not a matter of minor importance either to the dentist, or such as are afflicted with it. The following case came under my care, during the winter of 1843, Mr. W. applied to me for advice in regard to the irregularity of his son's teeth, who was about nine year's old. Upon examination, I found the following arrangement of his teeth to exist. The medial side of the left central incisor was turned anteriorly, so that its cutting edge formed an angle of fifty degrees from the proper circle or line of the cutting edges of the other incisores, its lateral edge inward; the central edge of the right incisor was directly against the centre of the posterior face of the left incisor. The right central incisor pointed about fifteen degrees to the interior of the true dental circle. The cutting edge of the left lateral incisor was turned so as to form an angle of eighty degrees from its true position in the circle; its proper anterior side, or edge, was turned inward, and the posterior side, or edge, was turned outward, standing with the anterior surface against the lateral edge of the left central incisor. The right lateral incisor, with its cutting edge, at an angle of forty degrees, its posterior edge, or side, pointing outward, and its anterior inward. The posterior primary teeth were all remaining, some quite loose. There may

not be any thing in the treatment of this case, new or interesting to the profession, but I will give it. I took a cast of the part, and formed a heavy narrow plate, which was clasped to the molar teeth, and then soldered flat wire upon the plate at the proper points and turned them into hooks which caught upon the external edges of the irregular teeth, and every two days the hooks were shortened, until the teeth were all brought against the external edge of the plate, which was the exact form of the proper dental arch. The right central incisor was easily moved out by the pressure of the plate. While this was going on I used a strong stimulant to induce energetic action of the absorbing vessels. By this treatment the desired end was accomplished in six weeks.

ARTICLE IV.

Abrasion of the Teeth. By J. TAFT, Surgeon Dentist, Xenia, Ohio.

ON the 5th of November, 1846, Mr. M., aged about 30 years, desired me to examine his teeth. I found some four or five of the molares slightly decayed, which I filled; when directing my attention more particularly to the anterior teeth, I found the superior incisores worn down almost to the necks; the central incisores more than the lateral, and the canines less than the latter. I directed him to close the jaws, when I found the points of the superior and inferior incisores could not be brought nearer together than one-fourth of an inch, by any motion of which the jaw was capable; when the jaws were closed the inferior incisores were almost perpendicular below the superior, at which time the space between the superior and inferior incisores presented a semi-elliptical form, its greatest width being one-fourth of an inch between the superior and inferior central incisores, and its length terminated at the first bicuspides of each side. I inquired of the gentleman if any thing

had been used between the teeth which could have worn them to such an extent, when he assured me that nothing of the kind had ever been used, and that the teeth had not been used in mastication, or even for seizing any thing for a number of years. The loss of substance was an entire mystery and wonder to himself. The circle described upon the edges of the superior incisores is as regular as could be drawn with a compass. The inferior incisores have suffered no loss. Had it not been for a beautiful provision of nature, long previous to the present examination, the nerves of the incisores must have been exposed; but there had been a deposit of bony matter, which so completely filled the dental cavities, that the surface presented was as smooth as if it had been burnished. That portion which filled the dental cavity was semi-pellucid. As to the cause, I am not able even to give a reasonable conjecture.

ARTICLE V.

A Case of Molar and Maxillary Absorption. By WILLIAM A. PEASE.

[From the Dental Recorder.]

SOME time in May last, a lady, Mrs. C——, called upon me and wished me to examine her face on the left side. To use her expression, "her cheek was falling in, constantly shrinking, and she did not know but it would continue so to do, till she was perfectly deformed." Upon examination, I found an indentation so large, as to be perfectly visible to any one in the room, somewhat resembling a very large dimple and not very dissimilar to a scar, when adhesion has taken place between the skin and periosteum, as is often witnessed in necrosis; though without a change of color. It was situated at the inferior edge of the os malar, at its junction with the os maxillary and near the posterior attachment of the masseter muscle, immediately above the antrum highmorianum. She complained of no pain,

and no pressure, there was but slight tenderness. She said she had received no injury, nor experienced any pain or swelling of the part, and the first intimation she had of its presence, her attention was directed to it by a friend several weeks previous; that since that time, it had steadily, though slowly increased. There was a slight depression in the bone and less muscular and adipose matter than was natural above it. My attention was next directed to her mouth, which I found in a wretched condition; all the teeth in the left superior maxilla being defective, mostly broken off level with the alveolar, particularly the bicuspides; the first molaris, a very large tooth, was badly decayed, a mere shell and of a dark purple color; it having been filled several years since by a then respectable, self-styled dentist, with mineral paste; I think she said, he termed it succedaneum. It was then very dark, and oyxdized, and it was self-evident on the most superficial examination, that the juices of the mouth had free access to the whole, or nearly the whole surface of the filling. The second molaris was nearly broken away, as well as the dens sapientiæ and in a most filthy condition. The gums turgid, and slightly inflamed; bleeding on the slightest pressure, and of a dark, unhealthy color, though still retaining their attachment to the necks of the teeth. By gently striking the teeth with an instrument, there was a dull pain experienced immediately under the indentation on her cheek, and by tracing the external fangs of the teeth with the finger, there was a sensitiveness felt, particularly at their upper extremities. She was a strong, healthy woman; of a full habit, the sanguine temperament predominating; pulse full and quick; and she was judged to be about seven months advanced in pregnancy. This, combined with considerable dread of any operation, and a disquietude of nerves, together with an entire exemption from pain induced me to advise her to wait a short time; that I might watch the progress of the disease, and be better able to judge of its proximate cause, and the means most suitable to afford relief. About the first of September, she called again, said it was constantly increasing, though destitute of pain; that she believed the left side of her face would be badly deformed.

She was now less nervous; pulse strong and regular. She having in the interval accomplished the period of utero-gestation, and been delivered of a dead fœtus; said her attending physician had advised her to again consult me, and submit to any operation I might deem essential to her recovery; found a visible increase in the indentation, with considerable elongation, it being perpendicular, and much resembling an ellipsis, the lines of which had been produced to nearly a point. Upon again tapping the teeth with an instrument found increased sensitiveness, which had extended to the second molaris; with dull pain on pressure with the finger over the fangs; gums same as before. Advised the immediate removal of the teeth, if not for the sole, as a preliminary means of cure; founding my diagnosis on the fact, that the teeth were very large and strong, and would be likely to have corresponding long roots, which might perforate the plate of the antrum; being also dead, and extraneous substances, perhaps with ulcers attached to them, they might have lighted up an inflammation of the mucous membrane and periosteum, which extending to the bone, was producing its absorption; or the roots not extending to the antrum, being still foreign bodies, nature endeavoring to relieve herself of the burden, had induced a morbid, abnormal action, producing inflammation of the bone and process and a tendency to, if not caries. Though caries was not then judged to be present, from the absence of pain and much soreness and external swelling; neither was their apprehension of tumor or polypi. Extracted the second molaris, found the roots not as long as expected and unaccompanied with ulcers. The third next, as less trouble was anticipated from these than the first. On applying the forceps to the first, it immediately crushed in level with the alveolar, bringing away the large cement filling; divided the roots and extracted singly; they were quite long, but could not discover that they penetrated the sinus. She left, expecting to call in a few days: saw her after an absence of six weeks; the indentation on her face had not increased, it was free from pain or soreness, the gums healthy and naturally colored; the alveolar considerably absorbed and every thing in-

dicating health. She expressed her conviction, that the disease was eradicated, which I judged to be the case.

Now, was this maxillary and malar absorption; for such I now consider it to have been; which had produced a lasting and unnecessary deformity, the result of diseased action induced by this large oxydated amalgam filling, or was there sufficient cause without it in the dead teeth and roots? To me it was evident that the tooth containing the filling was the most directly implicated in the disease, accompanied as it was by tenderness along, and at the extremity of its roots, at my first examination, and at the second, it had extended to the second molaris, thus showing if either had been the exciting cause, it must have been this one. But the question then will arise, was the disease, if from either, attributable to the filling or to the roots? If the former, why should it, after having remained in the mouth some five or six years without inconvenience, abundant time having elapsed for the complete evaporation of the mercury, at this late period produce these deleterious results? I am unwilling to charge it upon the fillings, yet am thoroughly convinced from the disease having been arrested by or spontaneously ceasing to progress simultaneously and with the extraction of the teeth, that there was some relation existing between them like cause and effect. Nothing like salivation or mercurial disease was witnessed and the whole appearance of the lady, at the time the teeth was extracted attested a healthy tone of the general system. The above treatment is all that I deem to have essentially to have effected the disease, no active remedial agent having been prescribed by me.

ARTICLE VI.

Gutta Percha—Its Uses, &c. By G. F. J. COLBURN, Dentist, Newark, N. J.

THE new substance, similar to caoutchouc, recently introduced to the notice of the public, called gutta percha, is the coagulated sap and milky juice, of a whitish grey color, which

exudes from a tree belonging to the natural order, *sapotaceae*, a native of the island of Singapore, and the dense forests of the Malayan peninsula. It has many curious properties. Below the temperature of fifty degrees, it is of the consistency and hardness of wood. Unlike caoutchouc, it has little elasticity, possessing much tenacity when drawn out, and remains without contracting.

This material may be applied to various useful purposes. For the surgeon it makes excellent bougies, catheters, enema pipes, splints, &c.

The dentist may find in it a substitute for wax for taking impressions of the mouth, it will not adhere to the teeth, and becomes so hard in a few moments as to be readily removed, without danger of being disturbed by coming in contact with the cheeks and angles of the mouth. Also, if, on withdrawing the plaster cast, any of the teeth remain in the mould, the pieces can be removed without injury to the impression as would be the case with wax.

I have tried frequent experiments with this material, and succeeded admirably in obtaining correct impressions. When used for this purpose, the gutta should be thoroughly soaked in boiling water, then kneaded and moulded in the same way as wax to fit the case; both should then be immersed, and the water shaken off, and immediately placed in the mouth, and firmly pressed to its place.

The operator can greatly facilitate the hardening of the gutta, by dipping his finger in cold water, and bathing the case. It should be allowed to remain in the mouth for two or three minutes, when it will be sufficiently congealed to be removed with safety. The same piece can be remoulded any number of times, and is by no means unpleasant to the patient while in the mouth.

I have, also, instituted a number of experiments with this substance in order to test its practicability for filling teeth; the utility of which time must determine.

As this article has been but a short time known to the public, and possesses many properties that may be turned to the use of the dentist, is it not deserving the attention of the profession?

ARTICLE VI.

VALEDICTORY ADDRESS.

CORRESPONDENCE.

Baltimore College of Dental Surgery,
MARCH 6th, 1848.

At a meeting of the graduates, at the recent commencement, held this day in the college buildings: On motion, it was

Unanimously Resolved, That we listened with the most profound satisfaction to the Address of Dr. Eleazar Parmly, delivered on the occasion of our commencement; and believing that its publication would do much to benefit dental science,

Resolved, That Drs. H. Colburn, E. W. Mason and D. G. Varney, be appointed a committee to communicate the above resolution to Dr. Parmly, with the request that he will furnish them with a copy of the Address for publication.

Baltimore, March 6th, 1848.

TO DR. ELEAZAR PARMLY.

Dear Sir,—We take much pleasure in sending you a copy of the above resolutions, and sincerely hope that you will comply with the unanimous wish of the meeting. Very respectfully, and truly, yours,

H. COLBURN,
E. W. MASON,
D. J. VARNEY,
} *Committee.*

New York, March 13th, 1848,
No. 1 BOND STREET.

GENTLEMEN:

I have the pleasure to acknowledge the receipt of the resolutions passed at a meeting of the graduates, at the late commencement of the Baltimore College of Dental Surgery, together with your kind note, requesting a copy of my Valedictory Address for publication. While it gives me great pleasure to comply with your request, I feel a much higher pleasure in communicating to you the great satisfaction expressed by that highly distinguished professional gentleman, Dr. E. B. Gardette of Philadelphia, chairman of the awarding committee on that occasion, and also by his eminent associates, Drs. Maynard, Hullihen and Townsend, all of whom were highly gratified at the success and prospects of the Institution, and bestowed much praise on the graduates for the efficiency and cleverness manifested in the specimens of mechanical and surgical dentistry then brought before them.

I beg you will convey to your associates, and accept for yourselves, my warmest wishes for your professional success, and for your future welfare and happiness. I am, very truly, your friend,

E. PARMLY.

To Messrs. H. COLBURN, E. W. MASON, D. G. VARNEY, *Committee.*

ADDRESS,

Delivered at the Baltimore College of Dental Surgery, before the Faculty, Graduates, Students and Assembly, on the occasion of its Eighth Annual Commencement, March 2, 1848. By ELEAZAR PARMLY, M. D., of New York.

LADIES AND GENTLEMEN:

THE office I hold in this institution, through the courtesy of its honorable faculty, imposes on me the pleasing duty of addressing to the graduating class, such valedictory remarks, as the occasion may naturally inspire in the breast of an individual, nearly the whole of the active part of whose life, has been devoted to the practice of dental surgery.

Honored and encouraged as we are on this occasion, by the personal presence of ladies and gentlemen of this city, whose countenance and approbation would not be given to any but a good work, I would fain recall for my further encouragement, the memory of departed men of honorable renown, whose never dying spirits may be supposed to regard with interest and pleasure, the ceremonies of this occasion.

Gardette, Hudson, Hayden and Randall, where are they if not among the good and great of by-gone years, rejoicing in the rewards of lives well spent in the service of humanity. These noble minds unassisted by educational advantages such as we enjoy in the institution here established, and in which the graduating class before me have been carefully instructed, rose to unrivalled excellence in their profession, by the force of that industry, integrity and genius, which surmount all obstacles, defy all dangers, and remove all impediments in the road to fame and fortune. Encouraged by the ever enduring presence of such examples, which neither time nor death can easily efface, we come with confidence, we had almost said with pride, to speak of the institution which calls us thus together, and of the useful science for the rapid advancement of which, it has labored with success.

It may not be here considered out of place or inappropriate to call particularly to mind one whose highest pride and ambition was centered in the improvement and elevation of professional character—the design and object of this institution. *Horace Hayden*, the benevolent and truly amiable man, whose voice would have been heard here this evening, and who would have participated in these exercises, had he not been removed by the hand of death. In my last conversation with him, his whole mind was taken up in speaking of the best means of giving character, stability and encouragement to the practitioners of our art, and the young were especially the object of his friendly regard, of his high and generous consideration. And it was for their benefit, knowing that on them must depend, the usefulness, character and dignity of the profession, that he labored both in this institution, and in the American Society of Dental Surgeons, and no one can be a member of that body or a graduate of this school, without feeling that the benefit derived from both, is owing in a good degree, to the noble, generous, and self-sacrificing spirit of their late benefactor and friend, a man of genius, a lover of science, a friend to virtue, and an ornament to the profession, which this institution is designed to improve, elevate and perfect. Those who knew and loved him, will always cherish the memory of his virtues, and look forward to the time of reunion, when tears and sorrows are no more known for ever.

A few years ago the name of dental college was utterly unknown in the vocabularies of men, there had been colleges for other objects from remote antiquity, colleges for cardinals, colleges for priests, colleges academical and colleges medical, but it was reserved for the legislature of Maryland and its monumental city, to justify their enlightened regard for the public welfare, by founding a college of dental surgery, the first that has been known in the existing annals of our race.

The benefits of this enlightened and liberal policy, have been already felt for several years in many of the states of this confederacy. Young men have been sent from this institution into the field of labor understanding their work, not a single in-

stance of empirical practice, we are bold to affirm, has ever been chargeable upon any graduate of this institution. The reason is plain, a course of studies here effects two important objects wholly incompatible with professional quackery.

In the first place it imparts so much knowledge of the true principles of the art, that the causes of empiricism are wholly removed; we are willing to believe that ignorance, which is said to be the mother of superstition, is also the fruitful parent of dental imposture. This is certainly the most charitable conclusion in which we can rest.

In the second place, a regular course of instruction in this college impresses the minds of the graduates so deeply with sentiments of scorn and contempt for all mal-practice, that great indeed must be the temptation which would ensnare them in its guilt.

So well convinced of these facts are the members of the profession generally, that the national society of dental surgeons, has a standing ordinance, which admits to its honors, without examination, any individual who has passed with credit, the trying ordeal of the Baltimore College of Dental Surgery. This is an honor conferred on no other course of dental instruction, either public or private, in Europe or America.

The graduates of this college become convinced in the course of their professional education, of the respective advantages and disadvantages of honorable and dishonorable practice of science on the one hand, of ignorance on the other. They read the works, or otherwise learn the characters of the master spirits of the profession, who would have been distinguished in any calling of human life suited to their tastes and inclination. They thus become familiar with those intellectual and moral traits of character, those habits and manners which every where secure and command success. They know why in the present day it is, that such men as Cartwright, Bell, Nasmyth, Delabarre, Brewster and Koecker in Europe, Gardette of Philadelphia, Harris of Baltimore, Maynard of Washington city, Flagg of Boston, Elliott of Montreal, Westcott of Syracuse, Foster of New York, Hullihen of Virginia, Cleveland of Charleston, Tay-

lor of Cincinnati, and Hale of St. Louis, with many more, perhaps, of equal skill and honor have attained professional success, which has ranked them, and still ranks them, amongst the most prosperous, the most useful, and the most happy of mankind.

From the same source, connected with their professional studies, the graduates of the college learn the true cause of that disgrace and that discomfiture which justly attend upon professional imposture in all its forms. They know why it is that the Crawcours, the Mallans, and all their imitators and rivals of less talent and less enterprise but of equal empiricism, attain neither abiding wealth nor honorable fame, by the arts of imposture and knavery. The gullibility of the community, always fluctuates from subject to subject, so that like the celebrated moon-hoax, quackery of any particular kind is soon detected, and when once exposed, can dupe only those who are willing to be deceived.

This state of things reveals to us the only hope of empiricism, a meagre hope indeed, namely, that as "all fools are not yet dead," quackery itself may survive for a while both detection and disgrace.

Students educated in the Baltimore College of Dental Surgery, can never go forth into the world ignorant of the fact that the two classes of men just named, have attained their respective objects by very different means, they learn that the honorable and successful practitioner of the dental art, he who acquires fame, friends, admirers, and a fortune, as the reward of his exertions, must be in the outset and in principle, a man of inflexible integrity; quibbling, overreaching, prevaricating, deceiving are no parts of his character. His veracity, like the virtue of the wife of the Roman king must not only be irreproachable but unsuspected. He will then merit the full confidence of the public, and that which he really merits he will ultimately receive. Truth and honesty are "cities set on a hill that cannot be hid," but however truthful a man's moral character may be, if this truthfulness does not enter into his professional acts, and render them good and useful, his character is true but in part developed; he *wills* right but *does* wrong—

such a man is deficient in professional education, and he sets himself instantly to the study of his art. He finds a defect in his character which he knows how to remedy, and his honest heart prompts him to the work. No matter what obstacles short of impossibilities, stand in his path, the inner promptings of integrity impel him to surmount them, for the purpose of bringing his work into harmony with itself. If oceans intervene he braves their dangers, if labor be required he works with assiduity, if sacrifices be demanded he makes them promptly, for he separates not his love of virtue, nor his hopes of heaven from a faithful discharge of his duty to his fellow men. If his character be exalted by religious conscientiousness he is so much the more anxious to exalt the character of his works and duties, for he has heard the interrogatory from high authority: "If a man love not his brother whom he hath seen, how can he love God whom he hath not seen?"

After such a man has become throughly versed in the various duties of his calling, another valuable trait of character becomes indispensable, this is industry, concentration of energy, and effort to effect his purpose. He has become convinced that usefulness in a man's particular calling, is the best test of his sound, moral and religious character. Indefatigable industry in his calling, therefore, is the best expression of his sound, moral and religious life. With this conviction, therefore, and with affections in accordance with it, he will be industrious. If his professional labors do not absorb all his time, he will devote his leisure hours to study.

Dentistry, in its very nature, is one of the learned professions, it has its science and its literature, men of sterling genius both in this country and in Europe, have written largely and luminously upon all branches of our art, so that no student or practitioner is now under the necessity of being destitute of a dental library. Of this we have great occasion to be proud; did time permit, I would gladly give you a catalogue of such standing authors, as every dental student should carefully peruse. For it must be confessed that there would be much danger in imbibing error, if every author who has written on the subject,

should be accredited. But I may safely rely on the sources of your professional education, as every way calculated to protect you from danger in this behalf.

The standing authors to whom I have just alluded, can be neglected and disregarded only by those who would degrade their profession and level its attainments to those of handicraft workmen, or mere artizans in mechanical employment. That there are already practitioners enough of this sort, the history of the few past years abundantly confirms. But, that same history will show also, that many of our professional brethren, have hailed with gratitude, and improve with eagerness, the literary and scientific labors of their talented compeers. But neither class of these honorable examples can be imitated without persevering industry. The great wonders of our world, that have been wrought by men, have been done by a proper use of time, it is this that raised the pyramids, cultivated and subdued the earth, excavated canals, built almost interminable lines of rail roads, civilized the savage, caught and chained the untamed and swift winged lightning, gave to it our entire language, and made it the faithful and meteor-like messenger of our thoughts, our feelings and our affections—for which and by which the names of our beloved Franklin and Morse will be written not only in the remote ends of the earth, but even unto the utmost end of time. Thus, the proper use of time is invariably one of the elements of greatness. It has introduced the invention of pretty much all that goes to make up our personal and present comforts. It taught us in early life to love the twilight of morning, and to take pleasure in beholding the crimson tints of the glorious sun as they dispel the shadows of the rising day.

The two qualities just named, integrity and industry, may be regarded as the two pillars standing in the portico of the temple of Solomon, which he denominated Jachin and Boaz—Beauty and Strength, or those which Samson overthrew in the vigor of his hairy strength in Philistia's temple, causing the destruction of her princes, as long as these two pillars of a man's character remain firm and erect he cannot fall, to rise perpetually must be his destiny. His honesty of design is seconded by faithfulness

of execution, and with such a man ulterior triumph is made by a law of nature to be inevitable, as easily might a deep valley overtop its circumjacent hills, as such an individual come short of the smiles of fortune. It is of such an one, that a well known poet has well said,

> "On just desert let all success depend,
> And patient merit never want a friend."*

There are, indeed, other pillars in other parts of the temple of indispensable, if not of equal importance, they are essential to its usefulness, its symmetry or its beauty. Temperance, patience, gentleness of manners, purity of mind, neatness of bodily habit are a few of their familiar names.

If the structure of professional character be thus sustained, the parts subordinate will be in proportion, and the whole will be distinguished for its symmetry and beauty.

After what has been said, it scarcely needs to be remarked, that a character opposite to this one, which I have just given, namely, one in which neither honesty nor industy, nor temperance, nor patience, nor gentleness, nor purity is found, or in which several of these graces are wanting, is sure to debase and disgrace our calling, for by the acts of such a one, every high minded man is made to feel the shame that attaches to one bearing credentials of fellowship or the insignia of fraternity. Hence it is that the same poet I have already quoted thus cautions the community,

> "Beware of those whom science never taught
> The hard but useful drudgery of thought,
> For while in indolence their years have run,
> They ask the wealth that industry has won;
> Can charity for such desire success?
> No!—let them eat the bread of idleness."

The preceding remarks address themselves with equal force and pertinency to all the students of this useful institution, as well as to those of the graduating class, who have now completed their primary education; to them, in particular, I have a few words, at the close of this address, to say, which I trust will

* Brown's Dentologia

be received in kindness, as the result of the experience of one who has labored long in the field which they are about to enter, and who has advanced well nigh to the end of the journey which they are about to commence.

I should do injustice to my own feelings, and also to the enterprising founders of the Baltimore College of Dental Surgery, if I were to conclude my remarks on this occasion, without expressing to them my cordial congratulation at the gratifying success of their noble undertaking. If any human enterprise deserve success, it is, undoubtedly, that which originates in a desire of extensive usefulness, and is called upon to encounter many discouragements in its progress and accomplishment. The first step in the undertaking, which resulted in the establishment of this college, was embarrassed by difficulties which would have wholly dispirited ordinary minds, and we cannot here withhold the remark, that it is exceedingly well for the world that some minds are so buoyant with hope, so elate with confidence, so pregnant with resolution and perseverance, as that no obstacle can oppose, no danger intimidate them.

It is recorded to the honor of a brave officer, that being asked by his superior whether he could take one of the enemies' batteries, he promptly replied, "I will try, sir." But I remember well, that the founders of this college began their work with still higher pledges. To those who inquired of them whether they could procure legislative authority for the foundation of their college, they confidently replied, "*We will do it, gentlemen*," and we see how they redeemed their pledge. They procured their charter with all the privileges they desired, and we now see its happy influence in our country.

They obtained, among other privileges, the power of conferring the degree of Doctor of Dental Surgery on all the worthy graduates of this institution, and, also, on other individuals as its faculty might deem to be worthy of that honor. From this college, then, have thus issued the first dental diplomas authorised by state legislation since the authentic history of our race.

Let the honor of doing this be esteemed by themselves as a sufficient reward for the labor of its founders. But as if this

were not enough, they have had the additional satisfaction of observing the beneficial effects of their labors upon the character of the profession throughout the country. The influence of this college has been very great in checking the influx of unqualified individuals into the profession, for the last several years; in addition to this it has been a radiating focus, from which true science has perpetually issued, like light and heat from the sun.

That it may long continue in these important labors is the fervent desire of all honorable members of the profession throughout the world.

In conclusion, I deem it a pleasure to express my high admiration of the zeal, faithfulness and ability of the acting professors and teachers of this seminary. The examinations which have just closed, demonstrate, conclusively, the merit and competency of those who direct the studies of this institution; and may length of days, extensive usefulness, many social enjoyments, and much domestic bliss, be the reward of their exertions. But I must not close my remarks, without grateful allusion to those intelligent fellow-citizens, who always attest their wisdom by resorting to the best skill in the dental art. There are some, nay many, in our country, who would travel hundreds of miles for the purpose of obtaining good dental advice, and operations, rather than subject themselves for a moment to the arts of empiricism. To such we tender the thanks of all the honest and honorable members of the profession.

And on this occasion we are called upon to acknowledge the repeated and gratifying courtesy of many highly respected citizens of Baltimore, in giving countenance and encouragement to this institution by their personal attendance on occasions like the present. I will only add, after thanking you all for your patient attention to the foregoing observations, hastily, and, perhaps, incoherently thrown together, that it is my ardent wish that every blessing of heaven may perpetually attend the members of the graduating class, the gentlemen undergraduates, the professors and members of the faculty and the esteemed individuals of this assembly.

GENTLEMEN GRADUATES: This may be considered not only the most interesting, but the most eventful period of your professional life. You are now to enter upon the practice and duties of an interesting profession, which rests its claims to public favor, on its general utility as a branch of the healing art. You will be esteemed, honored, respected and rewarded, as really and as fully as the members of any other department of the medical profession. But when you leave your professors, the museum, the library, the lecture room, and the laboratory of this institution, do not, I pray you, consider your education completed. Hitherto, your practice, both mechanical and surgical, has been mostly under the eye of your professors and demonstrators in both branches of dental surgery, you are now about to commence under your own guidance, and will immediately be thrown upon your own resources, to carry out in practice the principles in which you have been carefully instructed; you will have but little to encounter compared with those who commence without knowledge, and your patients will even receive, at the outset, that benefit which has hitherto been sought and only looked for, from the old and experienced practitioner. Although you look to the products of the field in which you labor for support and for the reward of your toil, you must never forget that the field is one of humanity, requiring the utmost care and gentleness in alleviating pain and suffering, and the constant exercise of patience and forbearance with your willing but timid patrons; you will thus, by a deportment uniformly decorous and gentlemanly, meet with marked good will, and secure from all respect and kindly feeling. The time has gone by, in this country at least, (thanks be to the high-minded men that have gone before us,) when other professions, the merchant princes, and other magnates of the land, esteemed it wit to ridicule your calling, as one well deserving, from the great numbers of its professors, contempt and derision. But they have become convinced, within the last half century, that wealth and reputation are attendant upon industry, integrity and their sister virtues, as well in the dental as in any other profession.

It is but a little more than fifty years since, James Gardette,

a gentleman by birth and education, obtained a permanent residence in Philadelphia, and may justly be considered as the first who gave standing and elevation to the profession in that city. He was the first dentist whose talents and general deportment were of such a character as to make him the friend and companion of the learned and distinguished men in other professions, and the first dentist in that city whose personal virtues obtained for him a social position in the most refined and highly cultivated circles of society. I have now a letter in my possession written while I resided in London, by the honorable Joel R. Poinsett, our late minister to Mexico, recommending to me Philadelphia as the best place to settle in, mainly from the standing the profession had attained in that city, a standing given to it at that time in no other city on this continent. Let us then, in justice, acknowledge our gratitude, first, to the labors of James Gardette, and, secondly, to the accomplished dentist, scholar and gentleman, Edward Hudson, for laying in this country the foundation of professional character, upon which the most eminent, since their day, have barely been able to build superstructures corresponding to their own.

It is for you, my young friends, to preserve your calling in that respectable condition in which you find it. Although it may require less labor to do this, than to build the house into which you enter, it will, undoubtedly, be your duty to keep it in good repair. You owe this to society, which expects every man to do his duty; you owe it to those of your predecessors who have labored long and hard in the cause; you owe it to yourselves, who must stand or fall by the issue; you owe it to this institution which has a just claim to be honored by all its graduates. Such is the thorough character of a course of education here, and the competency, zeal and assiduity of your instructors, that each of you, in your practice, ought to be elevated above the ordinary ranks of your profession. Wherever you go, then, let the dignity of your deportment, your manly self-confidence, your untiring assiduity in making good your profession, your stern integrity in doing justice to all men, your pure and uncontaminated morality, preferring virtue to pleasure, your gen-

tlemanly habits, in all respects, be your successful passport to he favor of mankind, and to the approbation of the Most High.

In order to attain to all these goods, and avoid the evils which contravene them, one particular caution deserves your regard, as constantly as your daily meals or daily devotions—it is this—avoid, peremptorily, all unworthy companions. I allude not merely to that unfortunate and much to be pitied portion of the community, whose condition and misfortune are an eternal disgrace to those who should be their protectors, but I speak here of the society of young men of doubtful sense, but of undoubted dissipation; the acquaintance and familiarity of such persons is doubly deleterious to the man of business and of honor. On the one hand, this sort of connection is always demoralizing, and, rarely ever instructive. It is one of those yawning pits into which too many young men, with thoughtless levity, eagerly plunge, engulphing valuable time, and invaluable morals. It, moreover, prevents the advantage of useful associations; it is always in the power of young men to find good company, if they will, it is particularly so with those who are known to avoid bad companions. On the other hand, evil companionship is always disreputable in the eyes of the good and the wise. They insensibly fall into the opinion of the old adage, "that birds of a feather flock together," a saying not less distinguished for its truth than its poetry. And it cannot be justly denied that time spent in such associations might be far better employed in literary reading, scientific research, healthful exercise, harmless amusement, or any of the fine arts, in the cultivation of which, during leisure hours, some of our professional brethren have shown decided talent—such as Greeenwood in painting; Hayden in mineralogy and natural history; Solyman Brown in the composition of his beautiful poem of Dentologia and in modelling for sculptor; Roper in making a large and most beautiful collection of paintings, coins, autographs and medals. But I would say let none of these pursuits, however agreeable and useful in their place, be sufficient to interfere with the faithful performance of professional duty. He who would shine in any calling, must prosecute its

duties with unity of purpose. He must fix his eye upon the object of his ambition, and move towards it as steadily as the eagle pursues his track towards the sun. If he do not do this, he may chance to find himself at the evening of life, like the day-sleeping owl which flies about at twilight, in every direction, searching for scanty subsistence. Let your aims then be high and definite, if you cannot find in the personal character of any of your professional brethren, living or departed, a suitable model of imitation, put all their virtues together into one human form, into one beautiful composite order, and let that be the man of your counsel. Unless in your youthful ardor the standard of professional excellence be high, your attainments will be few and small. It is always more honorable to fall short of high aims through misfortune, than to exceed in low ones by accident. Be careful how you give credit to new methods and new inventions when they are in opposition to established principles. It is rare, indeed, that time does not prove them worse than useless, as it has done the practice of using mercurial paste for stopping teeth, which I look upon as being the greatest evil ever introduced into the profession, and I regard those who use it and those who encourage its use as being the greatest enemies to correct professional practice, and they will yet find that amalgam will fix a stain upon themselves, and upon the profession, "which neither the waters of Lethe will be able to obliterate, nor the *Letheon* to bury in oblivion," and, however dignified, learned or ingenious they may be, of this truth you may be certain, that their learning and their ingenuity has never yet reached their finger's ends—the education of which is an indispensable qualification in the good dental operator, so indispensable that no one can be good without it.

Our profession is not yet so overstocked with first rate practitioners as to have closed the gate of ambition to the honorable adventurer, there are indeed many dentists in the land, but only a few good ones: as these latter increase, the number of the former will be proportionably diminished, various causes will co-operate to produce this result, among which the gradu-

ates of this college will be conspicuous. I hope that each of you will be the means, either directly or indirectly, of inducing at least a hundred quacks to seek some more congenial employment. It will be a war of extermination, less bloody indeed, but more useful and more honorable, than that which has lately crimsoned the plains of Mexico, with the blood of thousands.

If any of you should be so fortunate, as to make a valuable discovery or improvement in professional practice, calculated to benefit the profession and its supporters, take the means of publishing it to the worthy members of your profession in such a manner that they may receive and dispense the benefit that it provides, this will give you a much higher satisfaction in after life than exhibiting in your office a gilded frame, containing a document of exclusive rights and privileges bearing the seal of the patent office at Washington, which hitherto in the greater number of instances have been obtained by designing men, arrogating to themselves that which justly belonged to others, having been by them conceived and long known and practised by intelligent members of the profession.

Have a good understanding with all, and cultivate the society of intelligent men, and particularly the experienced in your profession. I have often found conversations with such to be more profitable and valuable than reading or any other means of obtaining knowledge—but never barter professional truth for error, principle for gain, nor sacrifice the interests of your patients for the purpose of indulging in the lazy or idle habit of using that which costs the least labor, the least time, and the least money to their irreparable injury.

Be careful how you take into your hands without the concurrence or direction of a competent physician the powerful agents of late so freely and in many cases so recklessly used, and remember that you may possibly induce in some beloved and valued friend, that state which feels no change, that sleep which knows no waking. And while I would ascribe to the amiable and estimable Morton all the praise due for so great a discovery, I would in all frankness and candor say that, however valuable ether or chloroform may be in the higher and more important

operations of general surgery, they are in our practice, and particularly in trivial and unimportant operations, of doubtful utility, and may yet be the means of filling many a home with sorrow and many a heart with mourning.

If you could adopt some ingenious device, by which you could be regularly reminded at the break of day, or at the rising of the sun, of the great advantage to yourselves, and others of successful practice in your calling, and at the same time, of the injuries and disadvantages of carelessness and malpractice, it would be an invaluable memento of the importance of your daily duties. In yourselves the advantage of such practice would be incalculable. They are identical with the highest object of your pursuit. If your professional labors prove successful, they will be the foundation of personal independence, the joys of domestic life, the ability of extensive usefulness as men of means, and a wide diffusion of benefactions to your fellow men. These assuredly are objects deserving of your deliberate and persevering regard. They are worthy of untiring effort, and of the purest aspirations of lofty ambition.

To others benefitted by your professional labors an honorable and faithful exercise of your art, will be an incalculable advantage also. Many thousands of human beings may be saved by your skill not merely from excruciating disease, but from the irreparable loss of the organs of mastication. To be thus eminently useful cannot fail to be a vital element of human felicity. The mere recollection of it would not fail to give exalted pleasure to declining age.

On the other hand, the disadvantages and misfortunes which must inevitably attend upon defective operations and malpractice, deserve to be known in order that they may be avoided, to the mal-operator they bring disgrace and disappointment. The disgrace he may never know except in the just and utter failure of all his hopes. This failure is nothing more nor less than professional bankruptcy, a bankruptcy of hope, a bankruptcy of reputation, a bankruptcy of anticipated fortune. From such a catastrophe, may your education, your integrity, your industry, your manly virtues, your professional dexterity, long and

promptly protect you, and may the gracious smiles of superintending Providence ever irradiate your path.

I cannot better conclude these remarks, than in the beautiful and appropriate words of Dr. Charles A. Lee, in an address delivered on a similar occasion, in which he says: "We are proud of your bearing thus far, we think we see in your devotion and enthusiasm, indications of future usefulness and distinction, we believe you will play your part well as men, among men, we sympathise with you in the trials which you must necessarily encounter, we follow you in imagination forwards amidst the trying emergencies of professional life, and we glance still further on, till we see you enjoying the well earned rewards of virtue, perseverance and skill. Gentlemen, disappoint us not. Fulfil your destiny, execute your mission, carry out your purposes; with a brave heart, and manly courage, go forth in the strength of an all-wise Protector, placing your trust on high."

"The world is all before you where to choose
Your place of rest, and Providence your guide."

After Dr. Parmly had concluded his address, Dr. J. J. Adair, of Kentucky, rose, and in behalf of the graduates, made the following

RESPONSE.

FELLOW GRADUATES: Be pleased to permit me to extend to the kind father in our profession a hearty welcome, for the salutary instruction and paternal advice which he has this evening offered for our acceptance. And,

GENTLEMEN OF THE FACULTY: Permit me as one, a representative, and in behalf of my fellow-graduates, to tender you our most sincere thanks, and heartfelt gratitude for the kind, assiduous and successful manner in which you have so faithfully discharged the laborious and responsible duties which have devolved upon you as professors in this institution.

We are, sensibly, aware, that should our future career demonstrate that we have fulfilled our obligations as students, with the same triumphant success with which you have discharged your duties as preceptors, the Baltimore College of Dental Surgery

will never have cause to drop a tear of regret, at having begotten such sons to inherit her fame and perpetuate her memory.

But the amicable relation of pupil and preceptor, which has hitherto existed between us, you have been pleased to dissolve by the high honors which you have this evening conferred upon us; a testimonial of the estimation with which you have appreciated our attainments and proficiency; and, fellow-graduates, with this distinctive mark of favor bestowed upon us, shall we not be incited and reanimated to increased zeal and activity; to make every laudable effort, within our power, to accelerate the march of dental science; to promote and advance our profession in utility, in honorable repute, and to a more exalted position in society.

It is a matter of warm congratulation to every cultivated member of our profession, that at no former period in the history of the dental art, have the boundaries of its scientific truths been more copiously enlarged than in our present day. In Europe, Asia, Africa and America, in the islands of the sea, every where, and in all places, wherever the torch of erudition has kindled up the sparkling lights of philosophical research and inquiry, the glow and animation of medical and dental science are working out indestructible results, and building up, with imperishable materials, the temple, firm and fair, of truth and science.

But time admonishes us to be brief; therefore, in conclusion, we bid you a fond-hearted farewell, and may the comforts of earth, and the blessings of heaven accompany you through life, death, and endless eternity, is the humble invocation of your most obedient servants.

ARTICLE VIII.

Letter from W. P. Blake, *New York.*

Dear Sir:—I think it desirable to communicate to you, for publication in the Journal, an important application of the new material, gutta percha, to dental prosthesis.

While experimenting with this substance, recently, its adaptation to procuring exact impressions of the teeth and gums occurred to me, and was tested with very satisfactory results. Its great plasticity and softness, when heated above 100 deg., permits it to take the form of the teeth and gums as readily and perfectly as wax; and when, in a few moments, its temperature has lowered, it resumes its tough and elastic state, and, consequently, may be withdrawn without the least change or injury; having no "drags," as they are technically termed; this will give a plaster cast with the necks of the teeth perfectly formed, which cannot be obtained from wax or other inelastic material.

To prepare it for use, the purified and prepared gum is placed in hot water, until sufficiently soft to be moulded into the form required and pressed into the frame, which may be "undercut" in order to hold it more securely; the whole may be repeatedly immersed in the water until it is ready for the mouth; after being pressed sufficiently upon the gums, it must be carefully retained there from two to three minutes until it becomes hardened. To relieve the plaster cast, it is only necessary to warm the gutta percha by water, or otherwise to insure its safe delivery. The crowns of the teeth on the cast may be trimmed at discretion, to facilitate their drawing from sand, but their necks need no alteration. Close and perfect contact of clasps can, therefore, be at once attained, saving much time and labor in adjusting to the mouth.

There are many other purposes for which this singular substance can be used with advantage. In some cases it may be excellent for temporary stoppings.

ARTICLE IX.

From the Medical Times.

On Cleft Palate, and on Staphyloraphy. By WILLIAM FERGUSSON, Esq., F. R. S. E., Professor of Surgery in King's College, London.

[Continued from page 192.]

SURGEONS have long been familiar with the difficulty of keeping the parts quiet during, but especially after an operation, and many ingenious proposals have been made to obviate this. The most simple, and, perhaps, most reasonable was the plan of after-treatment pursued by Roux. The patient was enjoined to silence, and to abstain from any effort at deglutition; he was not permitted to swallow his saliva even. But this did not appear sufficient in all cases, and the distinguished author of the operation proposed to separate the soft palate from the hard by a transverse incision, and the plan was afterwards recommended by Mr. Bushe of New York.* This method was advised in examples where the gap was large and involved the hard palate, and it would certainly permit the anterior parts of the soft palate to be more readily brought into contact. Dieffenbach and Pancoast† have split the flaps.

The latter gentleman has described the process thus: "When the knots were prepared for tying, but before they were finally secured, Wenzel's cataract knife was passed from before backwards, through the attached side of the palate, to enable the two halves of the velum to come together in the middle line, as well as to divide the insertion of the palate muscles, so as to prevent them straining the outward edges of the palate asunder." Mr. Liston‡ has advised that, "before the ligatures are finally secured, the parts being put on the stretch, an incision should be made on each side towards the alveolar ridge, through

* An Essay on the Operations for Cleft Palate. By G. Bushe. New York, 1836.

† American Journal of Medical Science, vol. xxxii, p. 71.

‡ Operative Surgery.

the anterior surface of the velum, by which method the edges come together more easily, and the strain is taken off the threads, so that there is less risk of them making their way out by ulceration."

Dr. Mettauer of Virginia,* has proposed to increase the breadth of the two flaps, by making various incisions in the palate. One plan is, to make a series of lunated wounds through the flaps, each about half an inch in length, along the margins of the fissure, which are permitted to heal by granulation, and thereafter the ordinary operation is performed. Another plan of Dr. Mettauer's is, to make a long incision on the lower surface of the palate on each side of the fissure, at the time of doing the operation.

Dr. J. M. Warren has stated† that he had found the following course to be invariably followed by success: "The soft parts being forcibly stretched, a pair of long powerful French scissors, curved on the flat side, are carried behind the anterior pillar of the palate; its attachments to the tonsil and to the posterior pillar are to be carefully cut away, on which the anterior soft parts will at once be found to expand, and an ample flap be provided for all desirable purposes."

From the variety of plans here alluded to, it will be observed, that the difficulty of bringing the edges of the gap together, of preventing dragging on the stitches, or subsequent separation of the newly-united parts, had not been overlooked. It is singular enough, however, that none of them have had reference to the correct anatomy of the parts; indeed, scarcely an allusion has been made to this subject. Dr. Pancoast is, perhaps, the only party who has alluded in apparently precise terms to the muscles of the parts, for his incisions are intended, to use his own language, "to divide the insertion of the palate muscles." It so happens, however, that no palate muscle is inserted exactly in this direction. The line marked out runs parallel with the fibres of the palato-pharygeus; and were the le-

*American Journal of Medical Science, vol. xxi, p. 309.

†New England Quarterly Jour. of Medicine and Surgery, April, 1843.

vator-palati divided in the incision, it would only be by chance; indeed, it would be next to impossible to divide it in such a way; the knife would, in all probability, pass through the palate either on the inside or outside of the lower end of the muscle. In the quotation already given from Mr. Liston's work no allusion is made to the anatomy of the parts, and it does not appear that more was intended than to permit that relaxation which a gap on each side might be supposed to produce as regards approximation in the mesial line. In the last edition of the excellent volume alluded to, which has come out since the appearance of my paper on cleft palate, and after the author inspected my dissection, it is advised that the incision "through the anterior surface of the velum" should be made "well down by the sides of the uvula." It is stated, too, after allusion is made to my proposal, that "if the fleshy belly of the circumflexus palati could safely be reached and cut, this would, so far as I can understand, put the parts in a still more favorable condition to come together. Its tendon is certainly divided by the incision above directed, properly and effectually carried out." Doubtless it had escaped Mr. Liston's memory that my preparation proves that the circumflexus muscle has scarcely any influence on the palate—a circumstance which I have alluded to in my paper. The "fleshy belly" of this muscle may be reached with nearly as much safety and facility as that of the levator, but it seemed to me that so little good would result from its division, that I was content with the statement as to its comparatively unimportant action. An incision "through the anterior surface of the velum" would not include any portion of the circumflexus, and one "well down by the sides of the uvula" could not possibly reach the tendon of that muscle. Mr. Liston* justly observes that "the union is apt to fail under any circumstances," and, moreover, adds, in reference to my own views, "and I think that this was found to take place in the hands of the above-named professor, even after the division of the muscles as he has recommended"—a thought, the accuracy

* "Operative Surgery," 4th ed. p. 572.

of which I cannot impugn, although the reflections on this subject do not seem to me to have been either so extensive or founded on such accurate data as one might have expected, in an authority so unquestionable and so impartial: for it does not appear that Mr. Liston had remembered the two successful cases which were detailed in my paper presented to the Medico-Chirurgical Society, nor the statement* which I had subsequently placed in his hands, that I had been successful with the practice in six instances out of eight wherein I had performed the operation in the manner alluded to.

In Mettauer's plans, no allusion is made to the anatomy of the parts, some of the little wounds through the palate must implicate a few fibres of the palato-pharyngeus, but the long incision on the lower surface of the palate cannot touch any muscular fibres. In Dr. J. M. Warren's incision with the scissors, a portion of the palato-pharyngeus might possibly have been divided; but this plan, like all the others above alluded to, while intended to produce mechanical relaxation, had no special reference to the anatomy or physiology of the parts.

There are cases of cleft palate with which it would be unreasonable to meddle: the gap being so large and the soft tissues so narrow, that union could not possibly be anticipated. It has been supposed that when the two portions of the uvula are observed to touch each other during deglutition, the operation may invariably be undertaken; but the fact is, that in almost all instances these two parts touch at this particular time, however large the fissure may be, and it is better to be guided in deciding upon the propriety of an operation by the condition of the parts otherwise. In most cases where the osseous palate is open, there will be less certainty of a favorable result than if the solt velum alone were implicated. If it seems that only a small portion of the fissure in the soft parts can be closed, it will perhaps be best to leave the parts alone, and to trust for improvement entirely to an obturator or false palate, for it has sometimes been found that when there has been union

* "System of Practical Surgery," 2nd ed. p. 532.

only to a small extent, the condition has interfered with the proper adaptation of the apparatus.

The operation should seldom be undertaken until the patient has reached puberty. Much steadiness and self-command is required on his part, both during the operation and afterwards; and it is hardly to be expected that one under this age will have the fortitude to do what the surgeon expects of him. I have, in one instance, seen a youth of eleven years of age comport himself admirably during the operation; but any time between sixteen and four-and-twenty is that which should be preferred.

The mode of proceeding which I generally follow may be thus described:—The patient should be seated on a firm chair with his face to the light; the surgeon should stand a little in front, on the right side, and occasionally behind the patient. In this latter position he may see into the mouth by leaning over the face, and use his fingers with more satisfaction and facility than if he were always in front, for here he is apt to obstruct the light, and possibly fatigue his hands by holding them so long in an elevated position towards the roof of the mouth. With a knife, I make an incision, about half an inch in length, a little above the free margin on each side of the cleft, whereby the levator palati muscle is divided. The knife is sharp at the point, and also at each side, so that it may be readily passed through the mucous membrane and carried backward and forwards to enlarge the wound to the requisite extent. The point of the blade is entered above the middle part of each soft flap, where there is the greatest thickness of tissues, and, whilst it is carried deep against the levator muscle, it is moved as just directed, and not withdrawn until the power of elevating the part seems to be done away with. If, when the knife is withdrawn, there should still appear strong muscular action in an upward direction, as may be ascertained by irritating the parts, it may be used again, as possibly the whole of the muscle may not have been cut across. All this can be best done while standing at the patient's side. The edges of the fissure should now be pared; the mucous membrane on the middle part of

each margin should be seized with hookbeaked forceps, and transfixed with a narrow, sharp-pointed blade which should then be run backwards and forwards so as to remove a slip of the membrane throughout the whole line of the gap. I have found it most convenient at this stage of the proceeding to stand before the patient whilst paring the left side, and behind him while cutting on the right side; but if the surgeon can hold the different instruments in each hand with equal facility he may stand as he chooses. During the time, and more especially, after these incisions are made, small pieces of sponge wrung out of iced water should be applied to clean the parts from blood and mucus; and the patient may also gargle the throat with cold water. The stitches should next be introduced thus:—A needle, set in a handle, armed with a portion of stout silk thread, three quarters of a yard long, should be passed through the soft flap about a quarter of an inch from the free margin, half an inch or less from the posterior edge of the osseous palate, from below upwards, and when the eye appears above or in the gap, the thread should be seized and drawn into the mouth with forceps; while the needle is withdrawn the end of the ligature (as yet double) should be brought out from the mouth to facilitate future steps, and also to prevent slipping. The same needle, or another like it, armed with a thread of a similar length but much thinner, should be passed in like manner through the other side of the left palate, exactly opposite the first puncture, and similar maneuvres should be repeated. By fixing this second thread to the bent end of the first, where it is hanging out of the mouth, and then withdrawing it in the course through which it has already passed, the thread intended to form the stitch will thus be brought through the opposite side of the palate, when one end of it (for it has as yet been double) can be drawn out so as to leave both ready for knotting. Two, three, or four more threads, as may seem requisite, can be introduced in a similar manner; and now all that remains to be done is to draw the edges together and fasten the thread. The foremost thread should be first tied in accordance with the ordinary mode of making the interrupted suture;

and the others should then be treated in the same order in which they have been introduced. Should an additional suture seem requisite in any part of the fissure, it may now be introduced by pushing the same needle from one side to the other—for now, when the parts are more fixed by the sutures, this may readily be accomplished. Before fastening the two knots furthest back, the pared edges should be brought together to ascertain the influence of the palato-pharyngeus in dragging them asunder. If this action seems strong, or if there be difficulty in drawing the parts together, the threads should be pulled forwards, whereby the posterior pillars of the fauces will be put upon the stretch, when each should be cut about half an inch behind the uvula in an outward direction, to the extent of a quarter of an inch, and then there will be greater relaxation. Long curved scissors with blunt points, are such as I use for this part of the operation, and the same are good for cutting off the ends of the ligatures, which is the last step in the operation.

In some instances it may appear best to effect the division of the palato-pharyngeus before passing the stitches. If this be desired, the fibres can be put on the stretch by drawing the uvula forwards with the beaked forceps. It will rarely seem requisite to meddle with the palato-glossus, but if its division is thought advisable, the scissors just described will be the best instrument to use. A small horizontal wound in front of the tonsil, and about midway between the tongue and palate, will suffice.

The hookbeaked forceps, and also those for seizing the threads, should be a little longer than those in common use; and the curved needle is similar to that often employed for the strangulation of hemorrhoids, nævi, and such like growths.

I have named a stout silk ligature, as I think it preferable to any other kind. Sometimes I have used a hempen thread, but it is difficult to get the material sufficiently small and strong at the same time. I have never used the lead ligature, as recommended by Dieffenbach and others, and, from my experience of the operation, should not feel inclined to try it. The threads

to be used should be well rubbed with wax, and it is highly advantageous to have them of different colors, whereby they can be more readily recognised during the proceedings.

In the ordinary operation, it has been found, on attempting to cast the common knot for the interrupted suture, that the first turn of the thread is apt to slip ere the second can be drawn. To prevent this, the points of the common forceps have been closed upon the first until the other has been brought upon it; or the surgeon's knot has been used* in expectation that the first twist of it being double, there should be less risk of slipping. Instead of a knot, Sir Philip Crampton† has passed the two ends of the thread through an aperture in a bead of soft metal, which he has squeezed close upon them at the proper distance. Mr. Brooke has, with an ingenious method, by means of glass beads, proposed to improve the style of suture here. The common knot and the surgeon's I have used most frequently, for I have always supposed that the beads might increase the after irritation. Besides, I feel satisfied that, in the operation which I perform, there is far less dragging on the threads than under ordinary circumstances, and that there is consequently less tendency to slip. But the slightest elasticity in the lateral flaps, unless indeed they be very broad, will be apt to produce a slip; and, to obviate this, I imagine that a knot of this kind will be found very serviceable. On one portion of the thread I cast a loose loop, with a single turn; the other end being then passed through it, the loop is drawn tight, and the fingers are then pushed towards the roof of the mouth and margins of fissure, as with an ordinary knot. If the loop is drawn tight there is no risk of slipping; it should hold, in fact, as if a metal bead were squeezed somewhat tightly upon the end within it. When sufficient tightness is secured, as regards the wound, a knot should be cast on the two ends of the thread, as in the common mode of fastening an interrupted suture. Professor Pancoast has advised that the knots should

* Professor Smith and Dr. J. Mason Warren.

† "Dublin Journal of Medical Science," July 1, 1843.

not be left in the mesial line, where they would be exactly over the wound, but that they should rather be kept to a side. It will be found easier to do this with the knot I have just recommended than with the common one, or more especially the surgeon's; and, as I believe it is rather an advantage to keep them off the wound (for the ends are apt to lodge in it, thereby preventing union to a certain extent, and causing irritation on the raw surfaces,) I advise you to think of this plan, which seems to me to embody the advantages of the beads, while the knots will, from their size, be less annoying to the patient than the materials alluded to.

When the operation for cleft palate is performed in the ordinary manner there is generally so much muscular spasm as to cause great difficulty in paring the edges, introducing the needles, as well as bringing and holding the cut edges together. By the plans recommended by me, these difficulties are entirely done away with, or greatly modified. The first incision is intended to take off the influence of the levator palati: if it be successful the palate seems to drop a little, and it is not so forcibly dragged upwards and outwards as under ordinary circumstances. Some movement of this kind may possibly still be present, and it may depend upon some of the fibres of the muscle having escaped the knife. The palato-pharyngeus, being still entire, will draw the margins of the fissure outwards; but when this muscle is divided there will then be no longer any action of the kind. This muscle, however, has so little influence compared with the levator, that it seems to me advisable not to divide it on all occasions until the probable amount of dragging upon the stitches has been ascertained. Even when its fibres are cut there will be some convulsive movement in the lateral flaps, for the part between the section and the attachment in front will be in some degree under the influence of muscular contraction; a shortening may take place when the parts are irritated, and this movement will be aided by the azygos uvulæ, which throughout the whole proceedings remains untouched unless when paring the edges or passing the stitches. Whatever irritability there may be, however great the spasm,

there will certainly be less difficulty in passing the needles, and less opposition to the closure of the fissure, than under ordinary circumstances. After the sutures are fastened, the parts are more quiescent than with the muscles entire; indeed, in the course of a few hours (if not immediately after the operation) the roof of the mouth may be touched or tickled as you choose, and there will scarcely be any movement observed. There is one advantage in the incision which I make on the upper surface of the flaps, which is probably not the least that I claim for my own mode of operating. The wound is in the course of a few hours filled with lymph, which so thickens and stiffens the palate that any twitching of muscular fibres that may have been observable before, are no longer apparent.

However efficiently the incisions which I recommend may be executed, the operation may, nevertheless, fail. The ordinary operation for harelip, when performed even under the most favorable circumstances, will sometimes fail, and occasionally a simple incised wound in the skin will not unite. Such results are still more likely to happen in the operation for cleft palate. The causes of failure may be as obscure as they often are in other wounds, but sometimes we may see reason why it has not taken place, and it may be well to refer to some of the circumstances likely to lead to an unfavorable issue.

The grand immediate object of the operation is to obtain union by the first intention, and this may be thwarted in various ways by the surgeon himself.

Hitherto, the principal cause of failure has probably been the dragging on the stitches from the action of the muscles, and the consequent disposition for the parts to be drawn asunder; and this cause, I would fain hope, may now be in a great measure obviated by the proceedings which I recommend. There may be a deficiency of adhesive action, or there may be an excess of inflammation. In one case the gap may fly open almost as soon as the stitches are removed, in another, the process of ulceration may produce the like effect after the lapse of days. Sloughing may actually occur, and there may be defects in the performance of the operation to account for this as well as

otherwise to cause failure. I believe that extensive incisions, whether on the plans recommended by Roux, Dieffenbach, Mettauer, Liston, Warren, or myself, may possibly induce defective circulation or excess of inflammation, and from either of these conditions sloughing is likely to happen. The stitches may be so numerous as to do harm, especially if drawn so tight as to impede circulation, or possibly there may be so few that the surfaces are not properly held together. The needles may be introduced too far from the margins, or not far enough, or perhaps the margins themselves may not be sufficiently pared. I imagine, too, that evil may arise from awkwardness in effecting the whole proceedings: for, if there be much manipulation, much squeezing, pinching, or poking with knives, needles, and fingers, the chances of adhesion are thereby diminished.

After the operation is finished, every care must be taken that nothing be allowed to interfere with the process of union. It is very certian that, if the patient were permitted to use the parts in the ordinary way, such as in eating, drinking, or even swallowing the saliva, they would be greatly disturbed, and adhesion might not occur. If all the muscles of the palate be left entire, as is the case in Roux's operation, the least effort at deglutition will cause considerable spasm and dragging on the stitches, and in examples where the gap is large, it is easy to perceive that much harm might result on such an occasion. Even in the proceeding which I follow, perfect quietude cannot be obtained, for the tongue below, and the constrictors behind and above, will still, during the act of swallowing, have such influence upon the palate, as greatly to disturb the healing action. It is requisite, then, to restrain the patient from such evil chances until adhesion has become so firm that it cannot be readily severed. Roux used to prohibit the use of food for eight-and-forty hours or more, and to prevent the party swallowing even his saliva. But danger may arise from too strict an adherence to this practice: patients have been known to take food at all risks and so break up the adhesions; others have become temporarily deranged; and the sudden deprivation from food has caused considerable shock to the system in

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many instances. Sir Philip Crampton* has not acted rigidly upon this rule, and has permitted some of his patients "boiled bread and milk, custards, soups, and jelly, twice or three times a day." In most of my cases I have given the patient gruel, soup, and wine frequently during the day, and have invariably noticed that those thus treated have recovered more rapidly than the others who have been refused all food and drink. The custom of permitting a hearty meal one hour before the operation should not be neglected; but there is great chance of its being ejected from the stomach during the proceedings, for there are few patients who do not get squeamish during the dealings with the palate. Indeed, I have remarked the chances to be greater in those who have partaken most largely of food beforehand.

A tickling cough almost invariably comes on a few hours after the operation, especially if the uvula swells much, as it often does—so that it actually drops on the root of the tongue and epiglottis, and I have found a draught containing sixty minims of the compound tincture of camphor, at bedtime, to be of great service in such cases. The bowels are usually constipated for the first two or three days, and I generally add a drop of croton oil to such a draught, with good effect. The patient may keep in bed, or sit up during the day, as he may incline; and, as a matter of course, when he is swallowing what you permit, he ought to do so with caution. On the second or third day after the operation, one, two, or more of the stitches should be removed; on the third or fourth day, if they have not already all been taken away, this should be done; they are more likely to do harm than good, if permitted to remain beyond this time. But the surgeon must use his discretion on this point, as indeed is necessary as regards all the after treatment, for I do not think it reasonable to give out rules which shall answer all cases. The mucus which accumulates about the roof of the mouth, particularly in those cases where there is an aperture left in the hard palate, must be taken carefully away, once or twice a day, with forceps, and it answers well to dry

* "Dublin Journal of Medical Science," July 1, 1843, vol. xxii.

the parts with a bit of soft sponge, which has been previously wrung out of a weak solution of nitric acid. In the course of eight or ten days the patient is usually so far well that he may eat and drink what he pleases, in moderation, and also take exercise in the open air. In a few days more his recovery is complete.

Among the cases to which I have alluded in this lecture, several possessed peculiar interest, in so far as regards the views which I have now endeavored to explain. One of the unsuccessful examples, according to Roux's plan, occurred to our esteemed friend, Mr. Bowman. I saw the operation performed; it was admirably executed, and every thing as regarded the favorable condition of the parts justified a sanguine hope of success. Yet in eight-and-forty hours all the stitches had given way, and the gap was as open as ever. Some years afterwards Mr. Bowman repeated the operation, with the addition of the incisions recommended by me, and a few weeks afterwards I saw the patient with a palate as entire as if it had been so from birth. One of my own cases was still more remarkable. J. T. had been operated on by Mr. Tuson, of the Middlesex Hospital, three different times, according to the method of Roux, and the opening was left in all probability larger than it was at first. There had been a small point of union about the middle of the gap, which by the traction on the flaps had been stretched out into a narrow band, not thicker than a bit of twine. Mr. Tuson was polite enough to send this patient to me: I operated, and had the satisfaction of securing union throughout the greater portion of the soft palate. When it is considered that the edges of the fissure had been three times pared before I myself touched them, it must be admitted that the parts were in a far less satisfactory condition for an operation than at first.

Besides the instance above referred to, as occurring to Mr. Bowman, Mr. Partridge has had a successful one, and so has M. Simon; in both of these, however, some secondary proceedings were requisite. One of the most successful examples of my own proceeding occurred to Mr. Storks. Union took place throughout, and in the course of a fortnight, it would

have been difficult to discover what had been the state of the palate before, or what had been done by the surgeon.

Even under the most favorable circumstances, a portion of the gap may not unite, or may open again in the course of a day or two, and it is then requisite to repeat part of the operation; the edges must be pared afresh, and one or more stitches passed, as may be necessary. This should not be done till after the lapse of weeks or months. An opening left after the first operation, though of such a size as to permit the air to pass readily through it for ten or twenty days, may, after some little further time, so close as to cause little more annoyance.

In infancy, the principal evil from cleft palate is, that the food is apt to escape upwards into the nostrils, but as the child grows older he acquires such use of the parts that such an occurrence rarely happens. The voice now appears as the principal defect, and it is not difficult for one familiar with such cases to foretel the state of the part as soon as he hears the person speak. If there be harelip, or the cicatrix resulting from an operation, for this defect suspicion may be so much the stronger, but of course no one can say with accuracy, what is the state of the palate until it is thoroughly inspected. As the chief cause of annoyance is from the voice, the principal object of the operation is to effect a favorable change upon it. There has, perhaps, been less said or written on this subject than it demands. The surgeon has usually been content with giving an account of the condition of the palate after an operation, but it is as interesting to know something of the voice. On this subject a variety of statements have been made in accordance with the experience derived from isolated cases. Sometimes the effect seems almost beyond belief, so great is the improvement; but in other instances there is no perceptible amendment. This latter result often arises from an aperture in the hard palate, with which the surgeon may not have meddled, and, until it is closed with some sort of obturator, the air escapes so freely through it that the benefit from closing the gap in the soft parts cannot be appreciated to its full extent. Even in such a case, however, the tone of the voice will proba-

bly have been greatly altered for the better; and if the opening alluded to be filled up, it may sound almost natural. It would yet be foolish to imagine that speech should be perfect, for how could this be with a person who had never articulated distinctly at any period of life? Some have been so sanguine as to expect this, and have been greatly disappointed. The fact is, that the party, however successful the operation may have been, has still to learn both how to modulate the voice, and to articulate. Some make great progress, and in the course of a few weeks or months the result is such as to please the most fastidious. In others the changes are more slow, for a year or more may elapse before much improvement can be noticed; and there are some who from want of ear, of power, disposition or perseverance, never make any satisfactory progress. In some of my own cases there has been all the improvement that could reasonably have been anticipated, but in others there has been very little. This I have attributed in some to the remaining imperfections in the palate, and in others to the want of care on the part of the patient to improve the pronunciation. I believe that all persons with this malformation have it in their power to speak more distinctly than they generally do. In one of the worst cases of cleft palate which I have ever seen, the party could articulate with considerable accuracy, and this was attributable to the care which she had bestowed in improving her voice. If, after an operation is successfully performed, the individual sets earnestly and methodically about modulating the voice and articulating distinctly, there seems nothing to prevent both being brought to a natural and average perfection. One of my patients was so zealous in his after studies that he soon spoke with more distinctness and accuracy than is generally observed in persons in whom the palate has been originally well formed. I have known some, however, so stupid, obstinate, or careless, that they could not, or would not, pronounce the word "yes," excepting in the old way. A person with cleft palate seldom sounds the "s" at the end of the word, because the air in expiration passes mostly through the fissure and nostrils. Even after the operation, the air is likely to pass

by the nostrils, unless the person be careful to open the lips properly. If he does this and pushes the tongue forward with its tip against the lower front teeth, the "s" will then become distinct; and if this little lesson be readily undertaken and ably performed, there may be good hopes of speedy and great future improvement.

ARTICLE X.

Anatomical and Physiological Relations of the Mouth. By Professor W. R. HANDY, M. D., Baltimore.

The surgeon dentist claims the *mouth* as his especial province —the particular field of all his labors—and the constant exercise and triumph of his art.

The natural inference from a statement like this, would be, that such an individual must have the most complete knowledge of the mouth, and the most thorough mastery of it in every particular over that of every one else—such should be the fact—but is such the true state of the case? Does it, we venture to ask, even approach to any thing like the truth in the matter? On the contrary, have we not most sadly to deplore, and most keenly to feel, on behalf of suffering humanity, the very, yes, we repeat it, the very *limited knowledge* even of the mouth, possessed by the great mass of those who pretend to practice dentistry?

Without any intention, whatever, to give offence, we most honestly ask, how many out of the great body of self constituted dentists, scattered over the length and breadth of our country, have a general, much less a precise, knowledge of the dental organs? their structure, functions, relations among themselves, and with the system at large?

The answer must certainly be, that it is only the few that possess any scientific acquaintance with the mouth, while the

great bulk, it must be acknowledged, view the mouth as little more than a blacksmith's shop, where they as mechanically extract a tooth and adjust a plate, as the smith fits the shoe and drives the nail to the horse's foot.

But we are happy to be able to state, that the dental profession, students of dentistry, and even the people at large, are beginning to be awakened to the importance of this subject—to wit: the absolute necessity of a scientific dental education—and as one of the fundamental and indispensable elements to be taught in such a system, the study of anatomy and physiology—the alarm has been sounded, and the little Spartan band of dental heroes who have long painfully felt that their profession should have the same dignity and elevation of the medical; that as each were part and parcel of the same great healing art—that, consequently, each should be placed on the same broad equality; to stand side by side, and share alike in equal honors and esteem and equal trustworthiness and confidence from the community. We say, that this noble little band, who have so long struggled for such a result, are now beginning to realise the fruit of their hard earned toil; are now beginning to see the dawn of the future meridian sun, when in all the splendor of his brightness, he will make the circuit of his course, side by side, with that of his medical brother; that the day is fast approaching when the science of dentistry will be acknowledged to have the same family origin as that of medicine; when the claims of relationship will not only be established between the two, but be gladly embraced by both; and when the twin brothers so long divided, will now be seen to be walking hand in hand, and marching joyfully together, onward and upward, each in their respective spheres, though both in the same great circle of good—striving alike to reach the goal of their utmost ambition, to wit: the blessing of mankind, by removing disease, restoring health, and thus augmenting the amount of human health and happiness.

To hasten such a desirable result, and keep alive the attention already awakened to the subject, we propose in the present article, not only to still further direct attention to, but to convert, if

possible, by our feeble efforts, this now aroused attention, into a deep, thorough, and abiding conviction, and into a firm, well settled, and unshaken principle of future thought and action.

To do this, we shall attempt an examination of the relations of the *mouth*, and enter into a somewhat critical analysis of its anatomical and physiological relations, as furnishing one of the strongest arguments, why every dentist should study anatomy as a fundamental and essential means to the attainment of skill, success and eminence in his profession; and without which, there must be certain failure in greater or less degree in all these great requisites.

The relations of the mouth in their most comprehensive sense, are co-extensive with the whole being of man—physical, organic and mental.

By its physical relations, the mouth is made the medium of the air we breathe, and of the food and drinks we take to nourish our bodies.

By the organic, it is united to all the organs of the body, thus forming an essential link in that great and mysterious chain, the various parts of which are bound together in one great brotherhood; forming thereby one common sympathy, one common interest, and one common enjoyment among the whole family of organs.

And by its mental relations, the mouth is the instrument of music, speech and oratory.

It is the organic relations of the mouth, which chiefly claim our attention; and these are the anatomical and physiological.

The anatomical elements of the mouth, are the same as those seen in every part of the body—we here find bone, muscle, gland, blood-vessel, nerve, cellular, mucous structures, and all entering as elements in its formation. These elements variously combined constitute the dental organs, and the varied actions of these organs comprise the functions of the dental apparatus. Now these same elements, with some others, though differently combined, enter into and form all the other organs of the body with all their wonderful variety in form, size, color, density, structure and function; and further, many of these

same elements of the mouth can be easily and distinctly traced into other and distant organs, and, in fact, with some throughout the whole system.

The mucous membrane of the mouth can be readily followed by one direction into the pharynx, oseophagus, stomach, intestines and collatitious organs, through their excretory ducts; and from the same point, as readily traced in another direction into the larynx, trachea, bronchia and lungs; thus, not only connecting all these various and remote organs, by one continuous anatomical structure; but further, by combining its functions with those of these several organs, of thus entering into and forming a most essential element in the complicated process of digestion and respiration—processes whose end is no less than the conversion of our food, first into chyme and chyle, and finally, into blood—the vital pabulum of formation, growth, and sustentation to the whole body.

The blood-vessels of the mouth, to wit: the arteries can be traced back to the external carotid, which, uniting with the internal carotid artery, forms the common carotid, which is traced still further back into the arteria-innominata of the right side and arch of the aorta on the left, and both ultimately into the heart; the great centre of the circulation and the common source from whence the blood takes its departure, to be distributed throughout the whole system; thus it is seen, that these two elements, simply of the mouth, the mucous membrane and its arteries, enter most largely into the whole economy, and connect functions at once the most varied, complicated and vital.

The *nerves* of the mouth can be traced to the brain and spinal marrow, thus uniting it with the sources of thought and voluntary power; and thereby putting it in the most intimate relation with all the organs to which the nerves, emanating from these quarters, are distributed, together with all their functions; comprising all the organs of relation, those which connect us with the external world, and consisting of locomotion, speech, and sense.

The glosso-pharyngeal and parvagum of the eighth pair of

nerves, is the direct route of connection between the mouth, brain, pharynx, oseophagus, lungs and stomach; while the frequent anastomosis of the sympathetic, with these same nerves, establishes still more closely and extensively the inseparable relation which the mouth has both with the organs of relation and nutrition.

That the relation of the mouth, is thus intimate, extensive and direct with these two great classes of organs, it is only necessary to mark the effect when any disturbance in their physiology or healthy action occurs.

Suppose, for instance, the brain becomes injured, or some most sudden, unexpected and disastrous news reaches it, immediately the eighth pair of nerves, with telegraphic speed, conveys the impression to the mouth, lungs and stomach; and as quick as thought, the healthy action of these organs will be more or less interrupted; the stomach, let its appetite be ever so keen, will have an immediate loathing for food, and if at dinner, will at once, most probably, vomit what had been taken.

The lungs will almost instantly cease to breathe, while the countenance is pale or otherwise, as the blood circulates or not, in the face.

Or let a child have difficult dentition, and the irritation of the gums, through the fifth pair of nerves, will be extended to the brain, and from thence be reflected upon the muscular system, producing convulsions, frequently, both frightful and dangerous: thus illustrating the relation of the mouth with the brain and muscular organs.

The cellular membrane of the mouth is *universal* with the whole body; it enters as an essential element in the constitution of every organ; surrounds, separates and connects every part, and has been beautifully compared to a mould, in which every organ receives its original and proper shape.

The *muscles* of the mouth possess the same physical and vital properties with the rest of the muscular system; so that in cases of general or partial paralysis, the mouth often partakes in the same affection, and may be either drawn to the one side, as in hemiplegia, or completely and firmly closed as in lock-jaw.

The *glands* of the mouth, forming another of its elements, and consisting principally of mucous follicles, are continuous with the same extensive chain, found strewed throughout the whole alimentary tube, from one end to the other.

Pathology might here be invoked to establish, if possible, still more conclusively this general relationship of the mouth with the system at large; for when the organs are in perfect health, each performing its appropriate function, and the whole acting in the utmost harmony, in the great drama of life—we say it is not always in such a state of things, that the general relations of the body are most readily detected and traced. On the contrary, it is often necessary that the discord of disease should enter into this happy family of organs, and disturb the mutual understanding, and constant and repeated acts of friendship and kindness; with all the reciprocal and mutual benefits, unceasingly flowing from such relationship—we say it is only then, that we become fully sensible, how deep is the bond of sympathy which unites each organ to every other organ, and how strong the ties which bind the whole to every part and every part to the whole; thus beautifully illustrating the mutual fellowship, dependancy and assistance which each most cordially extends to the other and the whole to each.

As for instance, fever is a general disease, and attacks the whole system. Do we find the mouth idle in this general assault any more than any other part? On the contrary, do we not find by a variety of the most significant expressions, as dryness of the mouth, furred tongue, parched lips, that it not only has a close family relationship with the system at large, but proves it, practically, by both feeling and sharing largely in the general distress, and endeavoring as far as possible to divide the calamity, common to the whole?

In scurvy, another constitutional disease, the *gums* swell, become spongy and bleed; thus showing that they sympathise with and partake of the relaxed and debilitated condition belonging to the whole body; and so with a variety of other examples unnecessary to cite, where this general relation between the mouth and rest of the system is equally shown.

Indeed, so close is this relation between the mouth and the body generally, and so vastly important is it considered by the medical profession, and being so viewed from time immemorial, that every physician invariably examines the mouth and especially the tongue, to ascertain the general condition and health of the system.

In fact, thus regarding the mouth as the *prime sentinel* of the many stationed by nature upon the watch tower of the body, whose duty it is to give accurate report of any changes occurring in the system, and to faithfully sound the alarm when there is any departure in the healthy action of the several organs.

It may be necessary now, to say a word upon the relation existing between the different organs and functions comprising the mouth itself, which may be styled its special or domestic relations.

That such relations exist, seem almost self-evident, and also as infallibly certain, that if any thing should occur to derange these relations, discord and confusion will be the necessary result; in the language of the proverb, "a house divided against itself must fall."

The mouth, as already stated, consists of a variety of organs and equally as great a variety of functions. It contains the organs of prehension, mastication and insalivation; also, the additional functions of suction, speech and expression; with the special sense of taste, and the general sense of feeling.

Now if any of these organs or functions be impaired or lost, there is more or less disturbance among all the rest.

Who is not familiar how the loss of the teeth, a cleft palate, and swollen tonsils alters the speech, changes the voice, and renders articulation frequently very difficult, if not impossible, while, at the same time, mastication is exceedingly tedious and imperfect? &c. And if the taste and general sensibility of the mouth be destroyed, all its functions concerned in the first stages of digestion will be performed, according to the experiments of Sir Charles Bell, in a slow, indifferent and irregular manner.

Enough has now been said we trust, to prove most conclusively, the first part of our proposition, to wit: that the mouth

is not simply an isolated part of the body, but, on the contrary, that it has the most extensive, direct and important *anatomical* and physiological relations with the whole system.

It may here be admitted, that these relations of the mouth are all as intimate and extensive as stated, but some of our readers gravely ask the question, suppose such to be the fact, of what use is all this to the dentist? or in what conceivable way has it any thing to do, or by any possibility afford any assistance in the practice of his profession? The dentist has only to do with the mouth, if he understands that, where is the use to go further? The answer to this question brings us to the second part of our subject, which is to show that a *knowledge* of the *anatomical and physiological* relations of the mouth are essential to the scientific dentist, and that such knowledge is also equally essential to skill, success and honest eminence, in the practice of the simply mechanical dentist.

The importance of anatomy and physiology to the surgeon and physician is universally acknowledged, it is regarded as the foundation of the whole superstructure of medical and surgical science, and the only solid basis of correct medical and surgical practice; hence its deep and thorough study is every where considered and required as an essential requisite to every candidate in obtaining his degree for medical honors.

Why, and how is such knowledge so indispensable to the surgeon and physician?

We reply, that to the surgeon it tells him *when*, and *where*, and how to operate; in other words, anatomy furnishes the principles, and lays down the rules, which are to guide him in his operations, and all that the surgeon has to do is to apply those principles—hence anatomical and physiological principles are the scientific, and the only trustworthy basis of the whole surgical art and practice. A few examples may suffice in illustration.

A surgeon is called to a case of compound comminuted fracture of one of the limbs, the soft parts are dreadfully lacerated, the bones crushed into many pieces, the arteries most of them ruptured and destroyed, and the mangled limb frightfully swol-

len. What is to be done? are the broken fragments simply adjusted with splints and other mechanical appliances, and the case left? certainly not, for here is a problem presented to the mind, the practical solution of which calls in requisition all the resources, all the knowledge, and all the experience, however extensive it may be, that can be possibly brought to bear upon it.

For, in the first place, before a single step can be taken, the question must at once be settled? can the limb be saved or must it come off?

To answer this question satisfactorily and safely, all the anatomical and physiological knowledge of the surgeon is demanded, at the very threshhold, and at once, as a few minutes delay might be fatal.

It involves the question, what are the resources of the system? or what can nature do herself in the case, towards saving the limb?

The scientific surgeon will at once ascertain the condition of the arteries, how many are destroyed? what ones are they? the principal or secondary branches? if the principal, are the collateral branches sufficient to carry on the circulation? If it be decided they are sufficient, this is one very important item of evidence in the case, but not by any means enough to decide the question.

If the arteries be still in abundance to carry on the circulation in the limb, is it also equally certain, that the general health of the system, the digestive and blood-making organs are in a condition and will be able to manufacture such blood as will maintain the integrity of the limb, and prevent mortification?

To settle this point, a knowledge of the organs and functions of digestion, respiration, secretion in their healthy state, and, in a word, the anatomy and physiology of the whole of nutrition is necessary.

The general health of the organs being deemed adequate, the surgeon is justified in an effort to save the limb.

But on the other hand, suppose these favorable conditions on the part of the limb and the health of the system at large be

wanting, then the limb must come off; the question now is, how should it be done? the answer plainly is, that anatomy is our only guide, it alone truly informs us what are the muscles to cut through, where are the arteries to be secured, what nerves to shun, in a word how the whole is to be placed in the best possible condition for being restored to health.

In the cases of hemorrhoids and fistula in ano, the surgeon has his anatomical and physiological knowledge equally taxed, and equally necessary in determining the when, and where, and how, or whether he should operate at all or not for the removal of these diseases.

If the patient be laboring under *phthisis*, where the powers of the system are broken up, or the functions of nutrition be laboring under any other grave disease, the decision of the surgeon would be rather against an operation in either case, for the reason that nature can render no assistance whatever, and that her powers, already nearly exhausted, would only be still further enfeebled, if not entirely destroyed by an operation.

To the *physician*, anatomy and physiology is equally necessary in pointing out to him the seat of the disease, the organ affected, and the nature and extent of that affection, a first and fundamental element of knowledge to the proper remedial treatment. And so with nearly the whole catalogue of surgical and medical diseases, a knowledge of their nature and seat, and the skill and success in their treatment, is, in a very large measure, due to *anatomy* and *physiology*.

Now the *mouth;* the special department of the dentist, is equally liable to accident and disease, with that of any other portions of the body, hence equally belonging to the dominion of surgery and medicine, and equally requiring the knowledge and skill of both surgeon and physician for their proper treatment; for example, the surgeon dentist is applied to for a set of artificial teeth—on examining the mouth, he finds the gums and palate inflamed, swollen, spongy and bleeding. Does he commence at once taking the impression and adjusting the plate under such circumstances? Certainly not, for the greatest ignorance as well as suffering of the patient would not tolerate so gross a violation of common sense.

Before he can do any thing either safely, skilfully or successfully, he must answer at the bar of his conscience as an honest man the following or similar questions in reference to the case. Is the inflammation common or specific, one of an ordinary character and soon subsiding, or one that is constitutional and extending deep and far back in the general system? or is it a malignant tumor, defying any or all kinds of treatment whatever?

Now the answer to these questions settles the all important point, whether it will be proper at all to apply any plate, and if proper, the time when it can be most safely done. And this answer can only be arrived at by a knowledge of the healthy structure and functions of these parts and their relations with the general system, in other words the anatomy and physiology of the mouth, and of the whole body, is necessary to form a safe and correct judgment in the matter.

For this state of the gums and palate, just described, are only so many morbid conditions or departures from the standard of health natural to these organs, hence to restore them back to this standard, it is plainly to be seen, that we must first know what that standard is.

Now the *health* of the mouth as well as every other portion of the body, depends upon the state of the general system, and this state of the general health, whether good or bad, determines the point of how soon the operation may be undertaken, for if the patient be laboring under syphilis or scurvy, these general diseases will be reflected with greater or less violence upon the mouth, and it will invariably suffer with other parts, in the precise proportion of its relation, established by the universal law of dependency, which it has with the neighboring organs, and with the whole system.

But how is the dentist to judge of the influence of disease of the body upon the mouth, when he knows nothing of the organs and functions of that body in the state of health? of their mutual action and reaction for weal or woe? And that in proportion as the organs of the body depart from their healthy standard of action, in like proportion, may we expect the

mouth to sympathise with and suffer in the general disturbance; and not until this general disturbance is lessened or removed, can we expect any amelioration or subsidence in the diseases of the mouth.

Hence, in the cases before us, the well informed dentist in anatomy and pathology, would know that scurvy and syphilis required constitutional treatment; that these diseases must first be eradicated, and the general health of the system first be restored before he can with any kind of propriety and success, commence the special application of his art in applying artificial teeth.

Again, without this general knowledge of anatomy and physiology, and of the reciprocal influence which the whole body and its several parts exert each upon the other, both in health and disease, it is equally impossible that the dentist can have any conceivable conception of the immense amount of injury that purely local diseases of the dental organs can produce upon the general health, and consequently how much suffering he might relieve were he in possession of this *anatomical and physiological knowledge*, which we are contending for as absolutely essential to a scientific and honest dentist.

But again and lastly, would any dentist desire to be ignorant, or to be considered ignorant of the different parts composing the mouth, their respective relations, mode of formation, development and peculiarities in contrast with the rest of the body? certainly not. But how can he possibly escape such a dilemma, when he knows nothing of the source from whence the materials for building up the dental apparatus are derived? to obtain which knowledge, the study of anatomy and physiology is his only hope.

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The two above named works are number one and two of the "Medical Practitioners, and Students' Library," comprising works on every department of medicine, making a library of reference for the practitioner, or a complete set of text books for the student, which the enterprising publishers, Messrs. Lindsay & Blakiston, propose to present to the profession in a cheap form—thus, presenting to the dentist an opportunity by becoming a subscriber, at a small expense, of procuring a medical library.

Without a wish to offend, we must express what has long been observed, a blamable deficiency of medical knowledge in the dental profession. There are too many of its members who practice the profession, relying on mechanical principles, and unacquainted with medical facts and doctrines.

There have been but few works if any, in the English language, that have devoted *as much* space to the subject of general pathology in its proper sense as was necessary for the proper advancement of the student, or the wish of the practitioner. One of the objects of Dr. Stille, in this work on general pathology is to fill this vacancy in medical literature. He makes, in the introduction to the work, the following observation, which is as applicable to the dental as to the medical profession, that "he is convinced that among the most serious defects in the present system of medical education, are an almost total neglect of logical analysis, and a tendency, where generalization is at all encouraged, to speculate on fanciful analogies, rather than to extract truth from fact. How fatal these influences must be to a successful study of disease, and to that confidence in medicine which experience imparts to the philosophical physician, is too apparent to require illustration. The author is persuaded that the view of medicine since which it is the province of general pathology to afford, is eminently adapted to correct these evils, by encouraging a more healthful discipline, and infusing a more hopeful spirit among those who are preparing for medical practice."

We feel that we cannot render the members of the dental profession a greater service, than to urge them to embrace this opportunity of procuring a medical library at a trifling expense by adding their names as

subscribers to this series of medical publications, which can be received through the mail at periodical postage. The whole series can be had for $1 per vol. or even at that price by subscribing for only five numbers.

The above works will be succeeded by the following named works, at intervals of two months or less, viz. Diseases of Children, by JOHN F. MEYS, M. D., Lecturer on Obstetrics and Diseases of Children, in the Philadelphia Medical Association.

Clinical Medicine or Internal Pathology and Therapeutics by MERIDETH CLYMER, M. D., late Professor of the Principles and Practice of Medicine, in the Franklin Medical College, Philadelphia.

Minor Surgery, by EDWARD HARTSHORNE, M. D., Lecturer on Legal Medicine, in the Philadelphia Medical Association.

General or Microscopic Anatomy, by FRANCIS G. SMITH, M. D., Lecturer on Physiology in the Philadelphia Medical Association.

Special Anatomy, by JOHN NEAL, Lecturer on Anatomy, and Demonstrator in the University of Pennsylvania.

Physiology, by FRANCIS G. SMITH, M. D., Lecturer on Physiology in the Philadelphia Medical Association.

Medical Chemistry, by ROBERT BRIDGES, M. D., Professor of Chemistry in the Philadelphia College of Pharmacy, &c.

Materia Medica and Therapeutics, by FRANCIS WEST, M. D., Lecturer on Materia Medica and Therapeutics in the Philadelphia Medical Association.

Clinical Surgery, by EDWARD HARTSHORNE, M. D., Lecturer on Legal Medicine in the Philadelphia Medical Association.

The American Dissector, prepared on a new plan by J. W. ALLEN, M. D., Demonstrator of Anatomy, &c.

The names of the Authors of the above works, and the reputation of the publishers are a sufficient guarantee that the works will be all that the profession have a right to expect.

A Popular Trealise on the Teeth; containing a history of the Dental Art, with anatomical descriptions of the Mouth and its appendages, and accounts of Chemical and Physiological Experiments on the Teeth. Also a full and accurate history of Ether or Letheon, for the Prevention of Pain, with directions for use. Designed for the use of families, and as a manual for the student and practical dentist. By MAYO G. SMITH, *Dental Surgeon. Illustrated by numerous engravings;* pp. 423, 12mo. Boston: JOHN P. JEWETT & Co.

The above is the title of a work which contains some very excellent advice. It is unique in its arrangement, and embodies considerable information, which, no doubt, would be valuable to the non-professional reader; but we fear it is too large for this class of individuals, and is too deficient

in detail for the dental student or practitioner. It is difficult to write for the popular and professional reader at the same time, on a subject like dental surgery, without saying more than will be likely to be read by the one, or not enough to be serviceable to the other; and hence we doubt the propriety of attempting to embody in one work, information intended for the benefit and profit of two opposite classes of readers.

We had designed entering into a critical analysis of Mr. Smith's work, but delayed our intention until so late a period, that we have only time merely to announce its publication. We may, however, do so in a future number of the Journal.

Miscellaneous Notices.

To the Fellows of the American Society of Dental Surgeons, and the Profession generally:

Medicine and all its branches, has arose from mere manual assistance, to its scientific dispensation, by the accumulation of facts, gathered from deductions and experience. Dental surgery has long suffered as a profession, in both respectability and usefulness, from a concealment or retention of ascertained facts or improvements connected with the profession. This being known to the American Society of Dental Surgeons; at its last annual meeting, with a desire to carry out its avowed object of elevating and adding scientific knowledge to the profession, passed the following resolutions:

"*Resolved,* That the American Society of Dental Surgeons shall, at its annual meetings, appoint a committee of five of its active members, who shall be known as a Committee of Practical Dentistry, the duty of which shall be to make an annual report to the Society of the improvements effected in this country in the management of disease coming within the scope of the dental practitioner, and the condition and progress of dental knowledge in America during the year of their service."

"*And be it further resolved,* That it shall be the duty of each member of this Association, to communicate all information, or novel results in practice, at their earliest possible convenience to the above committee, that the above resolution may be more fully carried out."

To enable the committee appointed under the above resolutions, to fulfil the duty thus imposed on them, it is absolutely important that every member of the profession, who either respects his calling, his interest or himself, should contribute such information as he thinks may be rendered serviceable to the profession. There is hardly any one connected with the

profession, that has not some peculiar method in his operations or practice, which he thinks superior to others generally known; an instrument or principle not in common use, or a case in practice which may illustrate some principle. Let all such be communicated, however trifling they may be, together with an explanation of their use and advantages, and should they be the agent in lessening only one pang of human suffering, their author would exhibit a philanthropic spirit.

The excuse by members of the profession, of a want of time, rendering it impossible to comply with the above, is an acknowledgement of selfishness and ingratitude, that no honorable practitioner should be guilty of. Must a profession do all for its members, when they withhold from it their support? Does a profession not only deserve, but does it not demand a return? And is this bestowal of time and energy on the profession cast away from individual interest? He that would bury within himself, or withhold from the profession an improvement or discovery in the minutest point of practice, from selfish motives, and individual interest, is unworthy of a place in, and unfit to associate with the society of the intelligent and scientific. From such we expect little, but from the liberal minded, the Association and the profession expect much. Every individual on entering the profession, becomes entitled to all its privileges and immunities, and also incurs an obligation to exert his best abilities to maintain not only its dignity and honor, but exalt its standing by extending the bounds of its usefulness.

It is hoped that this appeal will be answered by the profession generally, and particularly by the Fellows of the American Society of Dental Surgeons, by forwarding to the chairman of the committee, as early as the first of June next, such information as above referred to, or may come under the spirit of the resolutions.

It would hardly appear necessary to assure any that all contributions shall meet with just and careful considerations in the committee's report.

C. O. CONE,

Chairman of the Committee of Practical Dentistry.

Baltimore, *March* 14, 1848.

Commencement of the Baltimore College of Dental Surgery.—The annual commencement of the Baltimore College of Dental Surgery, for conferring degrees, was held in the saloon of the college building, on Thursday evening, March 2nd, and notwithstanding the inclemency of the night, a very good audience was in attendance to witness the ceremony.

After music by the band, the candidates for the honors of the institution were called up by professor Harris, and the degree of Doctor of Dental Surgery conferred by professor Bond, on the following gen-

tlemen, viz. Daniel Vandinburg, N. Y., R. W. Armstrong, Md., John M'Calla, Pa., B. A. Kennedy, N. C., Chas. Bond, Md., R. D. Addington, Va., W. H. Morgan, Ky., Joshua King, N. C., Thos. J. Jones, Ga., Hervey Colburn, M. D. Md., E. W. Mason, Md., Charles Barnes, Md. D. G. Varney, Mass., and J. J. Adair, Ky.

After this ceremony was completed, and music again, Dr. E. Parmly, of N. Y., arose and pronounced the Valedictory Address. He referred to the difficulties that the institution had in its infancy to struggle with, but which had all vanished before the energetic and persevering efforts that supported it, and now presented itself as the chief agent of professional elevation, standing upon a basis not to be shaken by the envious and sneering. He said that it was to this institution that the better portion of the profession turned their attention and expectations for the cultivation, growth, and respectability of the profession. That part of his address that particularly referred to the graduating class, was marked by wisdom and feeling.

Dr. J. J. Adair replied to Dr. Parmly on behalf of the graduating class, in a manner highly complimentary to himself, and expressive of the sentiments of those whom he represented. He thanked Dr. Parmly for the expression of interest in the Alumni of the institution, and particularly to the faculty for the manner with which they had labored to instruct them in the knowledge of their profession. Professor Bond made a brief reply from the faculty, expressing feelings of great gratification for the sentiments expressed by Dr. Adair.

The Awarding Committee then made their report through Dr. Gardette, who announced the name of Dr. Vandinburg, of New York, as the candidate that had been selected, after two days examination by the committee, to receive the award of a beautiful set of extracting instruments.

After music by the band, the class, with a few friends, retired to an entertainment served up in one of the rooms of the building.

We are in hopes to be put in possession of the addresses delivered on the occasion, so as to present them to our readers.—*Dental Intelligencer.*

The Discovery of the Application of Ether for the Prevention of Pain.—We received, a few weeks since, a number of Littell's Living Age, containing an elaborate report of the trustees of the Massachusetts General Hospital, of their investigation of the relative claims of Drs. Jackson and Morton to the above discovery; and we had intended giving, in the present number of the Journal, a condensed summary of the conclusions to which they had arrived; but as Dr. Jackson has requested a suspension of public opinion until the publication of a statement which he is engaged in preparing shall be made, we have concluded to defer doing so until we see what he has to say upon the subject.

Disease of the Lining Membrane of the Ear, followed by Purulent Effusion within the Skull.—Dr. Hutton communicated to the Dublin Pathological Society, a case of disease of the internal ear. The subject was a boy, nine years of age, who for a long period had a discharge from the left ear. Ten days before his admission into the Richmond Hospital, the discharge from the ear was almost completely suppressed; he vomited and had fever; got gradually worse, and was brought to the hospital. On his admission, he had the head retracted; any effort to restore it to the natural position caused great pain; the muscles of the back of the neck were spasmodically affected; the general aspect ghastly, the eyes straining, the teeth uncovered by the lips, and the whole body emaciated. He understood questions and returned answers, but in a few hours afterwards fell into a state of coma, and died. In examining the body after death, the external opening of the affected ear was found filled with caseous matter. There was an opening in the membrana tympani, and at the insertion of the membrana there was a fungous growth; the mucous membrane lining the cavity of the tympanum was thickened and granular, and adhered firmly to the bones; the ossicula remained. The temporal bone itself was not carious nor softened, nor was its mastoid process at all diseased. The dura mater was separated from the petrous portion, and there was lymph effused between them; the dura mater was sloughy, and there was an aperture in it. The upper surface of the cerebellum was smeared with purulent matter; the inferior surface of the sensorium was similarly smeared; the brain was not softened; no communication could be traced between the cavity of the cranium and the internal ear.—*Abridged from Dub. Jour.*

G. W. Parmly, Dentist.—We are gratified to learn, from the following, translated from a foreign paper, that the professional skill and moral worth of G. W. Parmly, son of Dr. L. S. Parmly of New Orleans, is so highly appreciated abroad as to have procured for him so complimentary a distinction.—*Balt. Ed.*

"We learn that Mr. Parmly, an American surgeon dentist, has been appointed, with the royal approbation, and on the nomination of Prince Alexander of Holland, dentist to His Royal Highness.

The large number of persons who have had occasion to avail themselves of Mr. Parmly's services will be glad to learn that this well merited distinction will make it necessary for him to remain permanently in this city, where he has become so much esteemed both for his surgical talents and his professional.

Dental surgery seems to be hereditary in the Parmly family. The American papers testify that members of this family hold the first rank among the professors of this branch of surgery, in the principal cities of the Union."

The Removal of a Foreign Body from the Duct of Wharton. By H. F. Campbell, M. D., Demonstrator of Anatomy in the Medical College of Georgia.—The novelty of the following case will be seen to warrant its publication.

Of foreign bodies in the duct of Wharton, so far as we know, there is on record but one case, which is that presented by M. Robert to the Anatomical Society of Paris, and which indeed has been considered quite remarkable. It occurred in the person of a shoemaker, in which case the orifice had been found to admit a piece of hog's bristle which subsequently became the nucleus of salivary calculus.

Case. Julia, a nurse, aged 14 years, while engaged at work, with a pin in her mouth, felt pain under the tongue, and endeavored to remove the pin, but on feeling for it could only find the *point* protruding at the side of the frænum linguæ. Her efforts to extract it by the point caused it entirely to disappear: becoming alarmed, she called for assistance. On examination, there could not be seen the least trace of any foreign body whatever: she said that "the pin was under her tongue, and had gotten into the flesh *head-foremost*." It gave her no pain, except when disturbed with the fingers; the orifice of the Whartonian duct was patulous and some saliva was flowing from it. On applying the finger to the floor of the mouth the pin could easily be felt near to the base of the lower jaw—though from the distance to which the head had proceeded towards the cœcal extremities of this duct, it was impossible to protrude it by applying pressure from behind, and further, from the handling to which the parts had been subjected, the point had been pushed out of the direction by which it entered, and having pierced the side of the duct was resting on the alveolar process. It was very moveable, and receded on the slightest pressure.

Failing of its removal by manipulation, the following method was adopted: Its exact situation being ascertained, the object together with the parts surrounding it was seized by the forefinger of the left hand in the mouth and the thumb in the digastric region, and pressed outward against the inner surface of the lower jaw under the alveolar projection: a tenaculum was then introduced from within outward through the mucous membrane, (avoiding the situation of the gustatory nerve which near this place crosses the duct,) so as to enclose the duct and hold the pin fixed; on elevating the tenaculum, the point of the pin became prominent about three lines posterior to the orifice of the duct. The mucous membrane and coats of the duct being cut through with a scalpel, the pin was removed with the dressing forceps by the *point* which protruded through the opening of the incision. A copious discharge of saliva followed its removal. The incision healed rapidly, and the patient recovered without any trouble. The pin was 1¼ inches in length, and of a proportionate thickness.

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ARTICLE I.

A Course of Lectures on Dental Physiology and Surgery, delivered at the Middlesex Hospital School. By JOHN TOMES, Esq., Surgeon Dentist to the Hospital.

(Continued from page 246.)

LECTURE XIII.

DISEASES OF THE DENTAL PULP—GRANULATION OR POLYPUS OF THE PULP—ITS NATURE AND TREATMENT—RECESSION OF THE PULP—DISEASES OF THE DENTAL PERIOSTEUM—INFLAMMATION, ACUTE AND GENERAL; CHRONIC AND PARTIAL—SYMPTOMS AND TREATMENT

Polypus, or Granulation of the Dental Pulp.—After partial destruction of the crown, and, especially, of the masticating surface of a tooth, and the consequent opening of the central cavity, the pulp instead of perishing may become the seat of morbid growth. Rising out of the damaged pulp cavity, you may find a small rounded, smooth-surfaced, vascular tumor, which bleeds from the slightest touch, and constantly emits a most fetid smell; even the blood that flows from it stinks. The new tissue, as compared with the pulp itself, is endowed with but a low degree of sensibility. Slight pressure, or even superficial laceration, produces but little pain.

The size to which dental polypus may grow is subject to considerable variety. Sometimes the tumor is small, resembling in size and appearance a large granulation; at others, so large as to cover over and completely hide the wreck of the tooth from the centre of which it has sprung. In the latter case the overhanging portion of the tumor may unite with the gum, and thus bury the tooth in vascular tissue.

Although polypus of the pulp is not necessarily attended with pain, yet should the new tissue be attacked with inflammation or ulceration, it then becomes extremely sensitive and painful.

Treatment.—The only radical cure is the extraction of the tooth in which the disease has its site. Should, however, your patient object to this measure, (and we cannot always make patients do as we would have them,) the tumor may be cut off as low down in the fang as can be reached, and its future growth kept back by the application of astringents. Tannin applied frequently will answer the purpose.

Recession of the Dental Pulp.—I have already told you that the pulp, under certain conditions, gradually wastes in volume and at last disappears. But there are some cases in which it is gone before we suspect the process of absorption to have commenced. To these I will draw your attention but for a moment, and then we shall have done with the diseases of this small, but sometimes most troublesome, organ.

Patients are occasionally met with who state that their teeth, one after another, have gradually and painlessly decayed away; that they have never had an hour's toothache or even tenderness of teeth, though now nothing but stumps are left in the mouth: in what manner, and when the pulp has been removed, we are unable to tell. All that we know is, that it has gone, and all that it is necessary to know is, what should be done with the tooth so circumstanced.

Diseases of the Dental Periosteum.—By a natural transition we pass from diseases of the dental pulp to diseases of the dental periosteum. Inflammation and its consequences, modified variously, either by the producing cause or by constitutional

peculiarity, or both, form the principal diseases of this appendage of the teeth. To the investigation of these we must now lend our attention, and first of all to inflammation so located. The character of the morbid action may be that of ordinary inflammation, or it may be modified by some pre-existing state of the system. The inflammation may take a rheumatic or a strumous type, in patients afflicted with rheumatism or struma, or it may take its character from the past or present influence of mercury on the system. Then, again, the whole, or only a part of the periosteum may be affected.

It will be best for me to take, first, inflammation of the dental periosteum in its most common, and hence most important forms; namely, active and chronic, and afterwards the various modifications of the disease. Before going further, however, I wish it to be understood that all those cases which terminate in the formation of pus in the alveolar cavity will be placed under the head of *active inflammation*, while the term *chronic inflammation* will be reserved for those in which the periosteum becomes thickened, the tooth loosened, and, the disease in that condition, if left to itself, smoulders on, till at last the tooth drops out. Of course there are many cases of a mixed character, which, in their various stages, belong as much to the one as to the other of these arbitrary divisions; but, with a knowledge of the two extremes, we are prepared for a medium case. Neither is it strictly correct to consider all cases of alveolar abscess as the result of active inflammation, seeing that the disease is often slow, and comparatively painless. Yet we must, for the convenience of description, have some division and arrangement of the subject, and the one I have proposed will suit our present purpose.

Active Inflammation of the Dental Periosteum.—The inflammatory action usually sets in with feelings of slight uneasiness and tension, which sensations are attended with a strong desire to press by the opposing teeth, or to shake with the fingers, the affected tooth in its socket. Slight steady pressure of the fang into the jaw gives relief so long as it is maintained, but the uneasiness returns on its withdrawal. At the same time vio-

lent and irregular pressure will produce pain. The uneasiness is soon followed by a dull heavy pain, and the tooth feels to be too long. The desire to push the tooth about continues, till disease has rendered the parts so tender that pressure can no longer be borne, and even the mouth cannot be firmly closed without pain. The tooth seems still to lengthen, and on an attempt to move it from side to side feels slightly loose. These latter symptoms obviously depend on swelling of the periosteum, and consequent lifting of the tooth in its socket. Early in the complaint there is tenderness and swelling of the gum, and generally of the external gum, opposite the fangs, whose periosteum is affected. In addition to this latter symptom, and often prior to its appearance, the free edge of the gum assumes a deep red color, without either pain, tenderness, or scarcely any swelling. The neck of the tooth appears encircled with a well defined red ring. I am not prepared to say that this symptom is always present, though, undoubtedly, it is seldom absent in the earlier stage; but as the disease advances this appearance is lost in the general inflammation of the gum. The pain becomes more severe, but still preserves its heavy wearing character, and, though not always constant, is seldom absent for many hours. These symptoms lasting, the part of the periosteum most highly inflamed, becomes detached from the surface of the fang. The most common seat of this denudation is around the apex of the fang. Into the interval thus formed pus is poured from the separated surface of the periosteum. The fang at this part loses its vitality, and is bathed in pus, which latter gradually increases in quantity, room being made in the alveolus for the dilation of the abscess at the expense of the bone. In some of the specimens on the table you will perceive that the bone is closely fitted to the neck of the fang, while about the apex the alveolus is hollowed out into a round cavity large enough to hold a pea. With the formation of pus a process is established for effecting its escape. Either the periosteum becomes detached through the whole length of the fang, and the matter is discharged at the neck of the tooth, or, what is much more common, a hole is formed in the wall of the alveolus, through

which the pus gets into the gum. We have then what is commonly called a gum-boil, an abscess in the gum communicating by a small hole through the bone with an abscess in the alveolus. If left to itself the abscess will work its way to the surface, and the contents will be discharged into the mouth. The symptoms now abate, the pain ceases, and the swelling lessens, but a minute fistulous opening in the gum remains, through which a small amount of discharge habitually escapes. The inner surface or coat of the alveolar abscess I have told you is formed by periosteal membrane detached by inflammation, and stretched out from the fang by the gradual interposition of pus. When the abscess breaks, and the contents readily escape, the inner membrane contracts and closes upon, but never unites with, the denuded surface of the fang. While the inner surface of the abscess contracts upon the fang the outer parts thicken and occupy the space which would otherwise be left between the abscess and the walls of the expanded alveolus. If a tooth be drawn after this has occurred, the coats of the abscess often come out adherent to the fang in the form of a fleshy appendage, and the tooth is said to have a fungous growth from the fang. Reunion between dental tissue and periosteum separated by disease, I believe never occurs. On the contrary, the denuded and consequently dead tooth substance, when in contact with, proves a constant source of irritation to the living and already diseased periosteum; hence, the lasting discharge and consequent fistulous opening. The quantity and the quality of the continued secretion varies. Sometimes it is almost imperceptible and serous; at other times it is abundant and purulent; varying in different individuals, and in the same individual at different times.

Such is the course which active inflammation of the dental periosteum usually pursues when left to itself.

The disease may, however, assume a much more active character; all the symptoms may be aggravated, and, in addition to which, there may be considerable symptomatic fever.

The following case occurred in the person of a medical prac-

titioner, and will give you a good idea of the severity the disease may assume:

Case.—T. S., age 30. In 1840, the crown of the left central incisor was broken off by a blow from a cricket ball; I refixed the crown by a pivot. In 1844, the crown had become discolored, and was replaced by the crown of a mineral tooth. The dentist who performed the operation found it necessary to increase the length of the hole in the stump, for the reception of the pivot. This was done on the 8th of October; on the morning of the 10th, slight pain was felt about the root of the tooth. Towards evening, the pain had greatly increased; the pivot was then removed. The night was passed in pain, and without sleep, and in the morning a fit of cold shivers was followed by heat, and terminated in profuse perspiration. 11th.—The pain still increasing, and attended by œdematous swelling of the face; added to which, there was great symptomatic fever. Pulse 130, full and hard, and accompanied by headache; twenty ounces of blood were taken from the arm, and salines were administered. Fomentations were applied to the face, and a dose of Dover's powder given at bed-time. 12th—Considerable and extending inflammation of the mouth near the pivoted tooth; more swelling of the face; headache rather less severe; six leeches were applied over the gums; blood taken yesterday rather buffy. 13th.—Swelling and pain much the same; a small abscess formed in the roof of the mouth, near the tooth. This was opened. The fomentations were continued, and the Dover's powder repeated at bed-time. 14th.—The abscess in the roof of the mouth was again opened, and a considerable quantity of purulent matter let out; the inflammation, pain and swelling much the same; six more leeches were applied, followed by fomentation and poultice; the Dover's powder repeated at night. 15th.—Symptoms no better; three more leeches were applied to the gums, and the fomentations were continued. 16th.—From this time the symptoms gradually abated, but left a small abscess over the stump, from which a considerable quantity of pus escaped.

On the 5th of November he applied to me. There was still pain in the stump; the gum was swollen, and pus escaped from an opening opposite the end of the fang, which, on removal, was found to be discolored, and evidently dead. The operation was followed by the escape of a quantity of unhealthy pus. From this moment no further inconvenience was felt; the gum healed, and the whole mouth returned to a state of health.

The stump was not transfixed by the second operation of pivoting; I mention this because I have seen several cases where a similar course of events have followed the transfixture of the fang in the operation of pivoting.

An equally instructive case, in which the disease was cut short, occurred in the son of the hospital carpenter, a lad of 14 years of age. He was attacked with severe pain in the canine of the upper jaw on the right side. The tooth was perfectly sound. The pain increased in severity for six-and-thirty hours, and the tooth then felt too long, and was greatly in the way when he closed his mouth, from the pain that was occasioned whenever it was touched by the opposing teeth. There was considerable headache, thirst, and a loaded tongue, and the boy said, "he felt almost light-headed at times." I removed the tooth, and found the fang everywhere coated with thickened and inflamed periosteum. The pain ceased with the smart of the operation, and there was no return of suffering. Had this tooth been allowed to remain, the case would, no doubt, have followed a similar course to that I just now described. An abscess would have formed in the alveolus, and, after more or less suffering, opened on the surface of the gum. The specimen is before you, and you may contrast for yourselves the diseased of this, with the healthy periosteum of other teeth.

LECTURE XIV.

ABNORMAL CONDITIONS OF THE ALVEOLI—NECROSIS—ALVEOLAR EXOSTOSIS—ABSORPTION OF THE ALVEOLI.

DISEASES OF THE GUMS—INFLAMMATION, ACUTE AND CHRONIC, OF THE GUMS—ULCERATION OF THE GUMS—TUMORS OF THE GUMS—EPULIS—POLYPUS—VASCULAR TUMORS OF THE GUMS—BLUE GUM—SALIVARY CALCULI, OR TARTAR.

Abnormal Conditions of the Alveoli.

I SHALL pass over the symptoms and treatment of those diseases of the jaw which are common to all bones, because they are treated of in your surgical lectures. Those abnormal conditions, however, which occur in connection with, and exercise an influence on the teeth, I shall notice so far as the treatment affects the teeth.

Necrosis of the Alveoli.—Death of a portion of the alveolar arch is far from uncommon. The greater part of the jaw may be necrosed or the disease may be confined to the socket of a single tooth, or even a portion of the socket. It may occur at any period of life, and to either jaw, but is more frequent in the under jaw. Sometimes we find necrosis of the alveoli in quite young children. Two or three of the sockets of the temporary teeth are lost, including also the cells containing the partially developed permanent teeth. Again, we find the same disease in old people, affecting perhaps the sockets of their few remaining teeth. An old man of sixty, recently in attendance at the hospital, lost the central incisores, with their alveoli, by necrosis; and these were the last of his teeth.

The symptoms of necrosis of the alveoli are similar to those indicative of the same disease occurring in any other bone, and the treatment must also be similar. Mechanical injuries of the jaw are frequently productive of necrosis. The extraction of diseased teeth unskilfully performed is a frequent cause of death of a small portion of the jaw; and this catastrophe may, and sometimes does, follow the drawing of a tooth, however dexter-

ously managed. In the great majority of cases, however, diseased teeth play an important part in the production of the disease, and have, therefore, to be considered in the treatment.

The dental pulp becomes exposed by caries or injury of the crown, inflames, and the inflammation extends to the dento-alveolar periosteum, and from thence to the jaw, and thus produces necrosis.

The teeth situated over the dead bone loosen and drop out, or much more frequently are removed by the surgeon. There can be no doubt of the propriety of removing the tooth that has occasioned the disease, but it becomes a question whether sound teeth loosened in necrosis should be at once removed. In the following case, read at the Medico-Chirurgical Society, by Mr. Sharp, the teeth were loosened by necrosis of the jaw, but afterwards became quite firm and useful, and, as it would seem, by the formation of the new alveoli. The sequestrum was exhibited, and figured for the Transactions. I have since had an opportunity of examining the sequestrum, and my friend Mr. de Morgan has been kind enough on this, as on many previous occasions, to make a drawing of the specimen a little more favorable for showing the alveoli than that contained in the Transactions. The case was reported as follows:

"Esther Watson, aged 20, consulted me, on the 8th of September, 1842, for an extensive necrosis of the lower jaw, with ulceration of the integuments under the chin. The mouth and lower part of the face, from the tumefaction, the ulcers, and the fetid discharge, presented a very disagreeable appearance. It had commenced with toothache about six months before, the pain being followed by an inflamed swelling, the swelling by abscess, and the abscess by ulceration. No effectual treatment had been adopted to arrest the progress of a very painful disease.

"It immediately occurred to me that a fungus arising out of the fang of the decaying tooth had been the origin of the mischief; and my first object was to remove this by extracting the tooth. The posterior bicuspid of the left side of the lower jaw was accordingly drawn, and a small fungous growth was found attached to one of its fangs. On examining the jaw with a

probe through the ulcerated openings, a large extent of denuded bone was felt, but it appeared to be firmly attached. My further attempts were therefore limited to prescribing an alum gargle to be freely used to cleanse the mouth, and zinc ointment to be applied externally.

"By these means the *comfort* of the patient was greatly promoted, and time was allowed for the process of separation to advance: they were continued, with the occasional application of a poultice, for three months.

"On the 13th of December, it being evident that the dead bone was completely detached from the living, the existing openings under the chin were thrown into one, and somewhat enlarged by two small incisions. The bone was taken hold of by a pair of forceps, and immediately, without pain or hæmorrhage, extracted. The portion removed amounted to about two-thirds of the entire lower jaw, and contained several of the alveolar processes.

"A slight dressing was applied to the wound, and, on desiring the patient to open her mouth, to my very agreeable surprise I found the entire set of excellent teeth (with the single exception of the one I had extracted) perfectly fast, and in their proper places.

"On the 5th of Jan'y, 1843, (in three weeks) the wound was very nearly healed, and the face had now recovered a perfectly natural appearance, having lost the swelling and inflammation which had disfigured it for so many months. She then returned into the country, and, as far as I have been able to learn, has since continued quite well."—*Medico-Chirurgical Transactions*, vol. xxvii, p. 432.

I am not aware that a similar case has been since reported. We have, however, had an out-patient admitted under Mr. de Morgan, whose case, so far as it was seen, followed very closely to that described by Mr. Sharp. The patient was an Irish woman of about five-and-thirty. She stated that she was attacked with violent toothache, at first confined to one tooth, that the pain afterwards extended to the jaws, and that the jaw became swollen. When she came to the hospital there

was considerable thickening of the front and right side of the lower jaw, with three fistulous openings in the gum, through which dead bone could be felt. The sequestrum, which was not detached, seemed to extend from the front to the side of the jaw as far back as the second molar, over which part the teeth were sound, but very loose. Pressure on the teeth produced pain; but when moved about, the fangs did not grate upon denuded bone. General and local treatment was adopted for subduing the inflammation, and the loose teeth were allowed to remain. At the end of a fortnight the pain and inflammation had subsided, and the teeth had become more firm. Two months afterwards the teeth had become comparatively firm, and the swelling about the jaw had greatly subsided, but the dead had not completely separated from the living bone. The woman now thought very lightly of her malady, and could not be persuaded that there was any disease left worth her attention; and from that time she has been lost sight of.

Then, as regards teeth loosened by necrosis of the jaw and alveoli, it will be well to let them remain if they are sound, and are not, so far as we can tell, stripped of their periosteum, and do not occasion irritation. Much will be gained if they are by nature refixed in new sockets; and though the probabilities are greatly against the occurrence of this event, yet we need risk nothing in taking what chance there may be. Wherever there is fibrous tissue there may be formation of bone; and it is possible that, if the dento-alveolar periosteum escapes destruction, it may contribute to form new alveoli.

Alveolar Exostosis.—After a tooth has been pulled out, the vacated socket is gradually filled up from the bottom by bone. This growth of bone in the socket sometimes takes place without the previous removal of the tooth, and thus gradually forces the tooth out of its natural position, or out of the jaw. This happens more commonly to the central incisores of the upper jaw than to any other teeth.

You may sometimes see people in whom one front tooth looks longer than its fellow, the one having been protruded by exostosis in the socket. In other cases, again, the teeth are

forced apart by thickening of that portion of the alveolus that passes between them, or they may be pressed outwards or inwards by osseous thickening of the outer or inner wall of the socket. The fangs of the displaced teeth are sometimes also shortened by absorption.

The disease will have its way in spite of treatment: hence in most cases treatment is but an addition of evil to that consequent on the malady. Eventually the tooth is forced out, or becomes so much displaced, or discolored from exposure of the fang, that its removal is necessitated.

Absorption of the Alveoli.—In advanced age the alveoli become absorbed, and the teeth, however sound in themselves, fall out. The process commences on the edge, and gradually advances towards the jaw, till the whole of the sockets are removed. This, which is a natural occurrence in the old, constitutes a disease when it happens to the young or middle-aged, and produces premature age in the jaws. Frequent or long-continued salivation, scurvy, purpura, are a few of the many constitutional conditions that lead, directly or indirectly, by producing increased vascularity of the gums, to premature absorption of the alveoli; while the use of a very hard tooth-brush, the accumulation of tartar ligatures, whether of silk or metal, round the necks of the teeth and in contact with the gums, by inducing irritation in the edge of the gums, lead to a like result.

In cases arising from any of these conditions, the disease may be arrested by removing the cause, and afterwards employing astringents to the gum.

Premature alveolar absorption sometimes, however, occurs without any accompanying disease of the gums, teeth, or periosteum, and in such case is not favorably influenced by treatment. This form you will find running through the various members of a family, and descending from father to son. The sockets of many or only a few teeth may waste away, while others remain unaffected; those of the front teeth being most frequently absorbed.

The patient should be enjoined to scrupulously avoid any

sources of irritation of the gum, and to use a very soft tooth-brush, and to prevent the accumulation of tartar on the necks of the teeth.

Diseases of the Gums.

Acute Inflammation of the Gums.—This disease is of rather rare occurrence, except as the consequence of specific agents administered for the cure of disease.

There are, however, a few cases on record of spontaneous salivation, in which the gums have been highly inflamed. I saw, a few months since, a case in which the gums of the upper jaw, and especially of the anterior part of the jaw, had become highly inflamed without any assignable cause; the pain in the mouth was great, and the flow of saliva excessive; the disease yielded to free scarification, astringents, and occasional aperients.

In salivation produced by mercury, the effect is first discernible upon the gums. Some hours previous to the coming of the metallic taste, and to the fetor of the breath, and also to the soreness and discomfort which mark the influence of mercury on the system, the gums show indications that these conditions are about to appear—in fact, that the patient will in a few hours be salivated. The state of the gum I am about to describe is, in fact, a premonitory sign of ptyalism, for should it appear, and the mercury be immediately discontinued, yet salivation will come on. The sign is this: the adherent portion of the mucous membrane of the gums assumes an opaque white color, contrasting strongly with the non-adherent portion, which preserves its natural hue or becomes more red. The free edge of the gums is movable, but that part which lies over the edge of the alveoli is firmly tied down to the periosteum; and as the edges of the alveoli present a festooned line, so the whitened mucous membrane presents in a corresponding festooned line. Again, where the mucous membrane is loosely reflected from the gum to the cheek, the natural color is preserved. The whiteness of gum is produced by an increased secretion of epi-

thelium, which from being thicker and more opaque renders the color given by the vessels to the subjacent tissue less apparent.

The surface of the mucous membrane when deprived of epithelium is studded over with innumerable small conical elevations, or papillæ. The thickened epithelium is readily rubbed off the tops of the papillæ, while it retains its full thickness in the hollows between them; thence, if closely inspected, the gums will not be seen to present a uniform white hue, but a mottled aspect; and this because the epithelium is thin over the papillæ and thick between them, and therefore more color will show through at one part than at another.

With the increased thickness there is a decrease of tenacity between the scales that form the epithelium, for the surface may be much more readily rubbed off than when in its natural state.

This curious and useful premonitory sign of coming ptyalism was, I believe, first noticed, and its value pointed out, by Mr. Corfe; at all events, he first of all drew my attention to the fact, and I am not aware that it has been described by any author. Since, however, Mr. Corfe mentioned the result of his observations as to the constancy of the sign, I have verified for myself its presence in all cases of salivation that have come under my notice, and from these I have written the foregoing account.

If you would make use of this indication in your practice, it will be necessary that you should carefully note the state of the gums at the time the mercurial treatment is commenced, for it is quite possible that other agents may produce a similar state of gum, and that such may exist previous to the exhibition of mercury.

Chronic Inflammation of the Gums.—This form of disease is very common in the middle and later periods of life, and when once established is apt to prove obstinate.

The surface of the gums becomes minutely modulated, and the secretion of epithelium increased; the papillæ are increased in prominence, while the substance of the gum is generally thickened, and the edges about the teeth thick and round. The

disease may be confined to the gum, about two or three teeth, or may extend over the whole mouth; the extent depending upon whether the cause be local or general.

The amount of pain consequent on this malady is subject to considerable variety, both in degree and character. In some cases but little uneasiness is complained of unless when eating, while in others the mouth is seldom free from pain. Then, again, in others it comes and goes irregularly, or sometimes regularly; the pain may come on every evening towards bed-time, and last for several hours. In any case the severity is usually increased in damp weather.

Chronic inflammation of the gums, if allowed to pursue its own course, may lead to one of two very opposite results; the alveoli may become absorbed, or they may become thickened and spongy. In either case the teeth eventually are loosened, from the diseased state of the gums spreading to the dental periosteum.

This form of disorder is very commonly the result of indigestion, when general; when confined to part of the mouth it follows pre-existing disease of the dental periosteum, of stumps, or diseased teeth.

Treatment.—The cause should be removed—the affected gum should be from time to time lightly scarified with a sharp lancet, much in the manner that granular conjunctiva is scarified; astringents should be frequently applied, and of these tannin is the best: this powder should be rubbed with the finger twice or thrice a day over the affected part. Teeth that have been loosened by inflammation of the gums tend to keep up the disease by their mobility; the patient may not, however, consent to their removal, especially if the front teeth are the ones implicated. In this kind of case I have seen great benefit follow the use of compound spirits of horse-radish, and also spirits of scurvy-grass; they should be applied to the affected gum, three or four times a day, with a bit of soft sponge.

There is a singular modification of chronic inflammation of the gums, in which the gum, instead of thickening and becoming irregular on the surface, seems rather to decrease in size, as-

sumes a very smooth and polished surface, and mottled aspect; the disease often extends over the surface of the hard palate, and is attended with acute intermittent pain; the pain may be confined to one side of the mouth, or even to half of the upper jaw; it very commonly comes on in the evening, and keeps the patient awake half the night. The cases of this complaint that have come under my notice have been confined to poor middle-aged females, in whom menstruation was becoming irregular, or had altogether ceased; and they have always been cured by the regular use of mild aperients. I have usually given a small dose of sulphate and carbonate of magnesia twice a day, and at the end of a week or nine days the pain in the gums has ceased, and that structure has assumed its healthy appearance.

Ulceration of the Gums.—The gums are frequently the seat of ulceration: a small, round, excavated ulcer appears, of a yellowish-white color, very painful when touched, and hence troublesome. It may occur in any part of the gums, but when it is situated between the teeth its existence is not readily recognized: hence patients have had sound teeth removed to relieve pain which was, in fact, not in the tooth, but in the interdental gum. Ulcers of this kind not uncommonly make their appearance on tumors of the gum, in situations where they cannot be seen, and so give much trouble.

There is one unfailing and almost instantaneous remedy—this is, nitric acid; the ulcer should be touched with the acid diluted with an equal part of water; a camel's hair pencil is the best instrument for applying the remedy.

I told you in a previous lecture that polypus of the pulp sometimes attains a considerable size, spreads over the edges of the fang from which it has sprung, and unites with the surrounding gum, thus burying the stump in the new tissue. When in this state, spreading ulceration sometimes attacks the surface of the new texture, and would destroy it but that it is constantly growing at the base, and thus affords material for the ulcerative process to continue. I have seen one case of this nature, in which the surface of the ulcer

looked like malignant disease; the surrounding parts had not, however, the induration peculiar to that frightful malady. The stump was felt with a sharp steel probe, and removed, and then the gum speedily returned to a healthy state.

Tumors of the Gums.—Tumors occasionally grow up in the gums, having originated in the vessels or vascular canals of the bone, in the periosteum, or in the substance of the gum itself.

When arising from either of the former tissues, the tumor is termed *epulis;* while those springing from the gum itself, being similar in structure to the gum, are usually called *polypus*, or *granulation* of the gum.

Epulis.—This species of tumor, itself fibrous, is developed in the fibrous tissue about the bone, from which it continues to grow, and presses before it the tissues of the gum; hence in external appearance it resembles in color, and generally in surface the gum; or the surface may be rough, and then it looks like a wart on the gum. The growth is generally slow, but gradually progressive, and usually unattended with pain, and the tumor, although tolerably vascular, is not prone to bleed.

The surface of the bone on which the tumor rests becomes more or less affected, the degree being proportionate to the duration and magnitude of the tumor. The Haversion canals in this part become much dilated, and they contain portions of the the tumor; for should it be excised down to the surface of the bone, but the canals left, the tumor speedily reappears; while if the affected bone be also excised the disease does not reappear.

Osseous tissue may be increased in quantity by a diminution in the calibre of the Haversian canals, or by an addition to the surface; or it may be diminished in quantity by the dilatations of the Haversian canals, or it may die, but in neither case does the tissue itself undergo any change; it is but a matter of *more* or *less*. Hence when epulis seems to grow from, or out of, the bone, it does not belong to the osseous tissue, but to the contents of the Haversian canals that traverse that tissue.

Osseous spiculæ not uncommonly shoot from the surface of

the jaw into the tumor, and in some cases isolated nodules of bone are found in its substance; in the latter feature epulis strongly resembles fibrous tumors of the uterus.

Epulis is strictly a fibro-cellular tumor, composed of interlacing fibres, mingled with nucleated cells, in every stage of advancement towards the formation of fibres. This disease may form in any part of the gums, but it most commonly springs up in that part which passes between the teeth.

Your patients will tell you that they first of all found a small lump on the gum, but that it gave no pain, and hence, for a while, did not engage the attention. As it increased in size, however, the teeth at its base loosened, were separated from each other, and got out of place. As the growth advances, the tumor becomes softer, more vascular, is indented by the teeth, and subject to ulceration, in which case it also becomes painful; sometimes it will assume very much the appearance of malignant disease. If a tumor of this nature be left to itself, it may gradually attain a considerable size, and lead to great displacement of neighboring parts, and disfiguration of the face.

When the disease has become formidable from its size or character, the treatment falls to the province of the operative surgeon; and to surgical writers I must refer you for a more detailed account of the disease and its treatment, but I would especially recommend your perusal of a clinical lecture on the subject, by Mr. Cæsar Hawkins, published in the Medical Gazette about eighteen months since.

Whatever be the extent of the tumor, extirpation and subsequent excision, or destruction by escharotics, of the surface of the bone from the canals of which it has grown, is the only sure manner of removing this otherwise obstinate disease.

Polypus, or Fungus of the Gum.—This disease is essentially hypertrophy of the gum, arising from mechanical irritation. If a tooth decay away on one side to below the level of the gum, leaving a sharp margin in contact with the gum, a tumor frequently forms from the gum, spreads into, and partially fills up, the hole in the tooth, or the vacancy between the two decaying teeth. The tumor is usually composed of dense fibrous tissue,

covered with epithelium; is almost insensible, unless ulcerated, when it becomes very painful. If the tumor be removed it will grow again and again, unless the bad tooth is removed, and then it will speedily disappear. These tumors show on section an undulating surfaced fibro-cellular tissue, covered by a thick layer of epithelium.

Caries sometimes attacks that surface of a tooth which lies in contact with a neighboring tooth, in which case, before an instrument can be introduced to excise the softened dentine, a portion of the tooth must be cut away; and it is sometimes necessary, before the operation of plugging is completed, to cut away portions of the tooth as low down as where the gum becomes attached. This operation is sometimes followed by irritation and slight polypus of gum. The new growth is highly sensible to pressure, and if food is forced by mastication on such a part, pain resembling toothache is felt. A small ulcer will sometimes form in this situation, and the pain simulate toothache so closely, that the patient desires that the tooth may be drawn; and I have seen teeth removed in such cases. The best application for the relief of this troublesome state of the gum is sulphate of copper applied every day or two. I have found a little powder, introduced on a quill and dropped on the part, is the most convenient mode of application; the relief is often instantaneous. The remedy should be applied some little time after the gum has ceased to give trouble. Other escharotics would no doubt answer equally well. If a sharp edge of tooth, or of projecting stopping, produce the irritation, no local application will be useful until these sources of mischief are removed by the file or otherwise. A similar state of gum is sometimes produced by the presence of a jagged piece of tartar, in which case the disease subsides with the removal of the cause.

Vascular Tumors of the Gums.—The gums are occasionally the seat of vascular tumors closely resembling in physical characters ordinary nævus. I have met with two cases of this disease: one of these I will describe. A female patient, of about 25 years of age, stated that some time past she observed a

small red pimple between the front teeth of the upper jaw, which bled every time she cleaned her teeth; that it gradually grew and spread on the surface of the gum, both in front and behind the teeth, and that with its increase of bulk the front teeth had separated and loosened; and that at times she suffered a good deal of pain in and about the tumor, which had become tender on pressure and very liable to bleed.

When the patient first came to me, the central teeth were separated about the eighth of an inch, were loose, and very tender. The tumor occupied the interval, and reached half way down towards the edges, and had spread itself over the gum immediately in front of the teeth for about half an inch, and covered a similar space on the palate behind the teeth. It was of a bright scarlet color, and soft in texture, and could by steady uniform pressure be deprived of color, and reduced to the level of the surrounding gum, but immediately sprung up by refilling of the vessels, or the removal of the pressure. The pain in the tumor was very irregular, both in severity and continuance; some days she scarcely felt it, while on others she had few moments of ease; pressure, however, even with the tongue, was at all times attended with, and followed by pain; the tendency to bleed, too, had been, and still was, a source of great alarm to the patient.

The patient was directed to apply tannin in powder to the surface of the diseased part every three hours. With this treatment the tumor became gradually diminished in size, became less vascular, and finally altogether disappeared.

The second case was similar to the one now narrated, and yielded to similar treatment.

I do not recollect to have seen a description of this disease; neither have I seen any other cases than the two now mentioned.

Blue Gum.—Dr. Watson, in his lectures, when treating on colica pictonum, says—"Very recently a most curious symptom, pathognomonic, I believe, of the presence of lead in the system, has been pointed out by Dr. Burton; and, now that it has been pointed out, one can hardly understand how it escaped

us so long. It is a blue or purplish line running along the edges of the gums just where they meet the teeth."* A paper on this subject, by Dr. Burton, was read at the Medical and Surgical Society, in January, 1840.

It is not my purpose to say any thing on the general effects of lead on the system; but I shall take this opportunity of relating to you a few observations on blue gum induced by lead, and the conditions necessary to its production. My position at the hospital has enabled me to make many inquiries into this curious phenomenon, which would naturally escape the observation of those whose vocation does not lead them to inspect in large numbers the teeth and gums of healthy subjects.

It has been observed that the presence of teeth is necessary to coloring of the gum. This is not all, however: the necks of the teeth must be encrusted with tartar, otherwise the edge of the gums will not receive the blue tinge: in fact the teeth are necessary only as affording lodgment for the tartar. I conceive, that, if tartar were held in constant contact with the edge of the gums by any other means than its lodgment on teeth, the gums would be equally tinged. I have frequently seen that gums about teeth encrusted with tartar were very blue, and in the same mouth the gums about teeth free from tartar, perfectly natural in color.

The coloring of the gum may be the sole indication of lead in the system. I not unfrequently find among my patients those whose gums are blue, but who declare that they have never suffered from colic or any other effect of lead; and, indeed, a few of these say they have not, to the best of their knowledge, been exposed to lead.

A short time since, a gentleman applied to me to remove a troublesome tooth. I found the necks of the teeth encrusted with tartar, and the edges of the gums intensely blue. He stated, on inquiry, that he had just returned from China, and that during the voyage he had been salivated for syphilis, but that he had not, so far as he knew, been exposed to the action of lead, either by inhalation or any other mode.

* Dr. Watson's Lectures on the Practice of Physic.

The continuance of tartar on the teeth is necessary to the continuance of blue gum. If the whole of the tartar be removed from the neck of the tooth, the blue tinge on the gum will gradually fade, while its intensity will be preserved about the teeth on which the tartar is allowed to remain. I cannot tell you how long it will be before the color will be wholly gone, when the tooth is allowed to remain, because the tartar may reaccumulate, and thus defeat an experiment for that purpose. When the tooth is removed, however, the blue stain disappears in two or three weeks, as the following case would indicate: I was called to remove an aching tooth for a lady who had taken two or three doses of acetate of lead for the suppression of uterine hæmorrhage. The gums exhibited the characteristic blue line. Nine days after the extraction of the tooth, the gums had come together, and the union was marked by a transverse blue line. At the expiration of three weeks the blue line had wholly disappeared.

In another well marked case of blue gum the patient had nothing to do with lead in any way, and had not been in the neighborhood of recently applied paint; but he was employed silvering mirrors, in which mercury and tin are the metals used.

These are not solitary instances in which I have found strongly-marked blue gum, and yet no other indication of the presence of lead in the system, or of the exposure of the patient to the action of lead. Hence I am forced to suspect that other metals may produce a similar discoloration of the gum. Should future investigation prove this suspicion to be well founded, the diagnostic value of this state of gum in relation to lead will be diminished.

In endeavoring to trace by what process the gums are stained blue, it must be borne in mind that the tartar itself is often similarly discolored, especially where it is in contact with the gum. The coloring material is probably sulphuret of lead, or a similar salt of some other metal. Tartar being very porous, admits into its substance fluids charged with animal matter

which may there be decomposed, and furnish sulphuretted hydrogen, as a common product of decomposition. Supposing a salt of lead to be present the tissue of an adjoining part, a sulphuret of lead would be formed, which would give the color in question to the tissues in which the formation took place. This action would be continuous so long as the metal remained in the system, and the tartar remained to afford a site for decomposition, and to hold the products against the gum.

The saliva itself contains sulpho-cyanic acid, and from this source sulphur might also be furnished.

Traces of lead may be found in the tartar of those affected by the metal.

Tartar a Salivary Calculus.—The saliva, together with oral and pulmonary mucus, hold in solution various salts, which are precipitated in a greater or less quantity on natural or artificial teeth in those situations where the solvent fluids remain at rest. Epithelial scales and other extraneous matters that may be floating in the oral fluids, or entangled between the teeth, become impacted in the precipitated salts, and thus contribute to form the concretion usually called *tartar*. And, in addition to these, infusorial animalcules are met with in recent tartar, and their remains in that which has been dried.

Simon says, "Tartar on the human teeth consists of earthy phosphates, epithelium-scales, a little ptyalin, and fat; and when examined under the microscope there are seen abundance of pavement epithelium and mucous corpuscles: and in addition to these, numerous long acicular bodies and infusoria of the genera vibrio and monas."

According to Berzelius, tartar is composed of—

Earthy phosphates, ...	79.0
Salivary mucus, ...	12.5
Ptyalin, ...	1 0
Animal matter soluble in hydro-chloric acid, .	7.5*

Dr. Wright gives the following as the constituents of healthy saliva:

*Simon's Animal Chemistry, translated by Dr. Day.

Water,	988.1
Ptyalin,	1.8
Fatty acid,	.5
Chlorides or sodium and potassium,	1.4
Albumen and soda,	.9
Phosphate of lime,	.6
Albuminate of soda,	.8
Lactates of potash and soda,	.7
Sulphocyanide of potassium,	.9
Soda,	.5
Mucus with ptyalin,	2.6

Berzelius gives the following as the constituents of nasal mucus, to which the bronchial mucus is very similar:

Water,	933.7
Mucin,	53.3
Alcohol-extract and alkaline lactates,	3.0
Chloride of sodium and potassium,	5.5
Water extract, with traces of albumen and phosphates,	3.5
Soda combined with mucus,	3.9

Tartar has been described by dentists as consisting of several different kinds, and named from the variation of color and density it presents. Thus, one sort is called black, another green, a third yellow tartar. The division is not, however, so far as I know, based upon any chemical difference, and may, therefore, be disregarded. I conceive that in most instances these physical variations are traceable to the time occupied in the formation or to the habits of the individual.

Thus, when tartar collects quickly, it is usually soft and yellow; and, on the other hand, when the process is slow, it is dark and hard. Then, again, in those who smoke much, the tartar is of a deep brown or black color. In teeth where one fang has been necrosed, and stripped of periosteum, the surface of the dead fang is often studded with modules of very hard greenish tartar. This tartar, during the time of its deposition, has been bathed in pus secreted from the lining membrane of the socket. The tartar is not an active corrosive agent, producing the destruction of the fang, as some dentists have supposed, but is consequent on its death and denudation.

We commonly find the concretion the most abundant about the posterior surfaces of the front teeth of the lower jaw, or about the buccal surface of the molares of the upper jaw, if from any cause those teeth are not used in mastication.

If a vertical section of a piece of tartar, carefully removed, be made, it will be found to present an inclined plane, the base of which lies in contact with the gum. The surface towards the tongue, or cheek, is usually smooth, but that against the gum is rough; and it is to that additions are mostly made. The gums become irritated and inflamed from the contact of the rough surface of the tartar; the alveoli become absorbed, and the gum recedes, making way for the further accumulation of the salivary salts. To the dental tissues themselves the tartar does no direct injury, but its effect upon the gums and alveoli is destructive, and hence, indirectly, upon the teeth.

Careful daily brushing will do much to prevent the accumulation of tartar on the teeth, but should it accumulate it must be removed from time to time by instruments fitted for the purpose.

Tooth powder that will dissolve the tartar will also dissolve the teeth, and therefore may not be used.

MANCHESTER MEDICAL SOCIETY

LECTURE XV.

OPERATIONS ON THE TEETH.—SCALING THE TEETH—PIVOTING OR GRAFTING TEETH—PLUGGING OR STOPPING TEETH—ON THE EXTRACTION OF TEETH—GENERAL RULES TO BE OBSERVED—ON EXTRACTING INCISORES, CANINES, BICUSPIDES, AND MOLARES—THE EXTRACTION OF STUMPS.

Operations on the Teeth.

WE have now arrived at the third division of our subject, namely, to *Operative Dentistry*. I have in previous lectures

told you when operations should be had recourse to; I must now tell you how these operations are to be performed. The subject being altogether mechanical, I can only direct you how to proceed, and what, with our present knowledge, constitutes success. I cannot give you dexterity; the attainment of that will depend on your own perseverance and manual aptitude.

Scaling.—This operation consists in removing the tartar from the teeth, and is performed by the help of small steel instruments, of various forms, suitable to the parts upon which they are intended to operate. The instrument-makers will furnish you with a great variety of patterns from which to choose: those on the table are the ones I make use of. The point of the instrument should be inserted under the base of the tartar, and by pressing the instrument towards, or rather outwards from, the crown of the tooth, detach the tartar in a mass. Having broken away the bulk of the tartar, each tooth must be freed from the smaller adherent particles, by carefully scraping its surface with the edge of the scaler. The intervals between the teeth must be treated in a similar manner, till every tooth is completely free from the concretion. The teeth may then be well rubbed with a piece of cane, or a brush, or a piece of soft wood, loaded with fine pumice powder, or powdered turkey-stone, and after this again with a little precipitated chalk. By these latter processes the surfaces of the teeth are well polished, by which their appearance is much improved, and their liability to become again encrusted diminished.

The patient should be directed to well brush the teeth, night and morning, with precipitated chalk, flavored to the taste of the user. Should the saliva be acid, (you will learn this by the use of test-paper) then the dentifrice should contain a portion of carbonate of soda: ʒ vij. of chalk and ʒ j. of carbonate of soda form a good alkaline powder.

If the teeth are discolored, patients will often ask you to restore them to their original whiteness. This cannot be done. Acids will for a time improve their appearance, by dissolving the outer surface of the enamel, and thus exposing a new surface, but they soon again become discolored and decay. Nothing

can be more mischievous to teeth than the use of acid tooth-powders, neither should any but an impalpable powder be used, otherwise the teeth will be worn into deep grooves, and are ultimately destroyed.

Areca nut charcoal has the effect of making the teeth look very white, and its use need not be objected to: charcoal made from wood should be forbidden, for it contains silex, and will wear the teeth. In choosing a dentifrice, your first care must be to ascertain whether or no the saliva is acid, and is acting upon any of the teeth. And this point must determine whether the polishing powder shall contain a soluble carbonate or no.

Several years since, a notice appeared in the Medical Gazette, stating that sugar acted directly on the teeth. I put some teeth into sugar and water and in honey, but at the end of six months I could not find that they were at all affected. Latterly much has been said against camphor as destructive to the teeth, though, as far as I know, with insufficient reason.

Plugging, or Stopping Teeth.—A well-stopped tooth, if the operation has not been too long postponed, is perfectly restored to its former durability and usefulness. I removed last year, from an old man, a molar tooth that had been plugged for thirty years, and had been serviceable till within the last two years, when it became loose from absorption of the socket. You will often see teeth that have been stopped ten and twenty years.

Seeing, then, that so much may be gained by this operation in preserving the teeth, you cannot give too much attention to its practice; for while it is among the most useful, it is the most difficult operation the dentist has to perform. This operation is divided into two parts; the preparation of the cavity for the reception of the plug, and the insertion of the plug. In the preparation of the cavity two points must be gained, otherwise the subsequent steps of the operation will be ineffective.

The first of these is to completely remove all the softened dentine; the second, to get a firm and regular orifice, of sufficient size as to enable the plug to be inserted, and at the same time not too large. If the cavity be large and the opening small, it will be almost impossible to make the plug solid in

those parts of the cavity which are overhung; and, on the other hand, if the opening be large and the cavity small and rounded at the bottom, like a saucer, the plug will not be retained. The best form of cavity has a circular orifice with perpendicular walls; in fact, cylindrical.

The situation of the disease must regulate our manner of proceeding. If the cavity be situated in the opposed side of a molar, the tooth must be cut away with a sculper or graver till an excavating instrument can be used. If the sides of the front teeth are affected, a piece of vulcanized caoutchouc should be straightened tight, and then introduced between the teeth; this, in endeavoring to regain its former figure, will separate the teeth sufficiently for the operator. When the masticating surface of a tooth is carious there is no difficulty in the operation; if the extent of the disease be slight, it may be removed by a broach of proper size. Having reduced the cavity, as nearly as attainable to the conditions I have described, the chips must be washed out and the cavity wiped dry with cotton-wool, and the plug inserted. In making the plug, our aim must be to so perfectly fill the cavity that all moisture shall be excluded, and that it shall be sufficiently hard to resist, equally with the tooth the wear of mastication. Unless these two conditions are fulfilled, our work will be imperfect, and ultimately fail.

Gold or tin foil are the best materials for making plugs. Whichever of these be chosen, the method of use is the same.

There are three methods of introducing foil for making a plug. In one the metal is folded into narrow strips, proportioned in width and thickness to the size of the cavity. One end of the strip is, by means of a conveniently shaped stopping instrument, pressed to the bottom of the cavity. The strip is then bent, and a fold passed to the bottom of the hole, leaving the first fold projecting above the surface. Fold after fold is introduced till the cavity is tolerably full. A wedge-shaped instrument is then introduced, and the gold pressed towards the walls of the cavity; more gold is, by a similar process, pressed into the cavity so obtained. This process is repeated till the

wedge cannot be forced into the plug. A flattened instrument is then used to compress the gold in the cavity. When we can make no further effect on the surface of the plug by compression, the surface is filed smooth and burnished. By a careful adherence to this plan, we make a plug composed of layers of metal arranged parallel to the walls of the cavity, and therefore not liable to fall to pieces or come out. But, on the other hand, had we made the folds at a right angle to the walls, and parallel to the bottom of the cavity, layer after layer would have peeled off till little or none of the plug remained, and the decay would have proceeded to destroy the tooth.

In the second method, a piece of foil of sufficient size is rolled hard, and spherical between the thumb and finger. This is gradually forced into the cavity, care being taken to get it well in round the outer walls. When the plug has been rendered as solid as possible, the superfluous portion is cut or filed off, and the surface burnished.

The third method of using metallic foil is a combination of the two preceding ones. A piece of foil is rolled up loosely that will readily go into the cavity. When in its place a wedge-shape instrument is passed into its centre, which has the effect of spreading the gold towards the walls of the cavity. The centre is gradually filled with folds of gold in the manner I have described. The wedge is used again and again till it can no longer be made to enter. The gold is then compressed on the surface, and the superfluous portions removed, and the surface burnished. When the plug is finished in either of the manners I have described, the circumference should be examined by a sharp steel probe. If this can be made to enter at any part, the hole so made should be enlarged by thrusting in an instrument as large as can be introduced, and the hole filled.

Either of the foregoing methods of plugging will answer, if well done. But of these I prefer introducing the metal in folds. The situation of the cavity, and also the size, will have something to do with the selection of the plan of operating. Then, again, one person will be more apt at one manner of procedure

than at another. All these matters of detail must be learned in practice. I should exhaust your patience, and greatly exceed my limits, were I to attempt to describe every variety in form and situation of cavity, and every modification and plan useful in plugging.

Where the cavity of a tooth is so large that the walls are too thin to bear the pressure necessary to the insertion of a gold or tin-foil plug, the amalgam of silver or of palladium may be advantageously used. Having prepared the cavity as for the use of foil, a little mercury is triturated in a glass mortar with a small quantity of precipitated silver or palladium, till they unite and form a paste, which is well squeezed in a piece of wash leather to force out as much as possible of the mercury. The paste is then again rubbed in the mortar, or in the palm of the hand, and then introduced into the cavity. The cavity, however, must be first well dried with lint, and care must be taken to get the amalgam in close contact with the whole circumference of the cavity.

The plug so formed hardens in the course of a few hours, after which the surface should be well burnished. The American dentists condemn this kind of plug, as it seems to me, somewhat unjustly. It is undoubtedly far inferior to either the gold or tin-foil plug, but it can be used where they cannot, and it is surely better than none. I have seen a mere shell of a tooth, that would have broken away on the first attempt at introducing foil, rendered useful for years by an amalgam plug.

Before leaving the subject let me warn you that unless the cavity be well prepared by the total removal of the softened dentine from the walls, and by getting a good, firm, and well-shaped orifice, free from acute angles, no plug will answer, and least of all the amalgam. It will fall out or become loose within twelve or eighteen months, and frequently in much less time, and decay will proceed. Teeth plugged with silver amalgam usually become stained of a deep blue-black color. When the palladium amalgam is used there is little or no staining, if the excavating be perfect. The latter amalgam is therefore preferable.

The Operation of Pivoting or Grafting.—When the crown of a single-fanged tooth has so far decayed that it cannot be plugged, and yet the root remains sound, a new crown may be fastened into the root by means of a piece of gold wire called a pivot: hence the name pivoting.

The operation is commenced by sawing or cutting off the crown of the faulty tooth. The pulp is then destroyed by passing up the cavity of the tooth a fine broach, and giving it a turn or two, by which the pulp is torn across near the extremity of the fang. The surface is then filed with a half-round file even with the edge of the gum. The pulp cavity is then enlarged and made cylindrical by a drill or broach similar in size to the wire we propose using for the pivot.

We must now select a tooth, whether mineral or natural, corresponding in size, shape, and color to the one lost, and from this the root must be removed, and the crown fitted accurately, by filing, to the surface of the fang to which it is to be attached.

A hole must now be drilled into the fitted crown, and a screw cut in it; a screw must also be cut upon the wire, which must be screwed into the crown, and a sufficient length left projecting from the crown, to occupy the hole drilled in the fang. The projecting part of the pivot is rendered a little rough, to retain a very thin coating of floss silk. In this condition it is passed into the fang, and if the adjustment has been carefully performed, the new crown will fit so accurately to the fang that the artifice cannot be detected.

The Americans sometimes use compressed wood instead of gold wire for the pivot. You will sometimes find it very convenient to adopt this plan in renewing a pivot, or when the hole in the stump is necessarily rather large.

Pivoting, though the neatest, is more frequently followed by mischievous results than any other operation performed by the dentist, and so common are these that many consider the operation as unjustifiable. Some degree of pain and tenderness is almost always felt during the first few days after the operation, and unfortunately it is not uncommon to have considerable in-

flammation ending in suppuration, as in the case I cited to you in Lecture XIII. But the consequence may be even worse than in that case.

The following statement was placed in my hands by a medical man who had some knowledge of the case which is related. ————, Esq. aged 25 years, tall and thin, but apparently in very good health. On his marriage trip he visited Paris, and there had the misfortune to break off a front tooth. Wishing to conceal the accident from his wife, he went immediately to a dentist. The tooth was pivoted (and I have no doubt carefully, for the dentist was one with a great and just reputation,) and the necessary concealment seemed insured. From the time of the operation, however, he had severe pain in the stump, which pain increased for four or five days, when he left Paris for Rouen. Upon arriving there the pain had become excessively severe; he consulted a medical man, but it was too late. Trismus came on within twenty-four hours, and was soon followed by tetanus and death.

On the Extraction of Teeth.—This is not the first time I have treated on the extraction of teeth. In 1841* I described and figured, with some pleasure, what I believed to be new and much improved forms of tooth-forceps, as possessing great advantages over the key instrument, then almost universally used. Now, after the lapse of six years, I am again on the same subject, and I shall proceed with increased pleasure; for during the interval the instruments in question have come into general use. To borrow an instrument-maker's phrase, "no other tooth instruments will sell now;" whereas, previous to the date of my paper, they had no such instruments to offer for sale.

Nay, in further testimony of the value of the improved forceps, a member of my own profession, after ordering a set of my instrument-maker, found them, on trial, so serviceable, that he was induced to write a little work minutely describing them, and strongly recommending their general adoption to the exclusion of the instruments then in use;† though, for the honor

* Medical Gazette, June 4th, 1841.

† Observations on the Extraction of Teeth, by T. Chitty Clendon, 1843.

and good name of our profession, I regret to say he altogether neglected to acknowledge by whom the instruments of which he had availed himself, and was describing, were designed and brought to their present state of utility, and published. Indeed, so anxious has this author been to take to himself whatever credit there may be in the improvements, that he has, whenever he had power, induced the makers to stamp the instruments with his name.

It is enough, however, that our means of operating have been improved, and that this improvement, whereby suffering is diminished, has been generally adopted. It matters not to the patient who invented or improved, or gave to the profession the instrument with which his tooth is removed, so long as that instrument is of the best kind, and skilfully used.

A few dentists have for many years been in the habit of purchasing their tooth-instruments in the rough, and filing them up into whatever shape they deemed best, but what this shape was, or is, was kept secret. Indeed, those who purchased finished instruments very commonly ordered the maker not to make known any of the particulars of construction. This time of professional secrecy has passed, or is fast passing away, and much to the credit of our profession.

I shall not have space to give you a history of tooth-drawing, and of the various instruments at different times in use, but must content myself with describing, as briefly as possible, the means and methods of operating we now employ.

In extracting a tooth, the following conditions should be fulfilled: First. The whole of the offending organ should be removed.

Secondly. It should be removed with as little injury as possible to the structures in which it is implanted.

Thirdly. The patient should be spared all unnecessary pain in the operation.

That method by which a tooth, or the remains of one, can be removed most certainly, quickly, and at the same time with the least amount of injury to the adjoining parts, will also remove it with the least pain; the suffering being in most cases proportioned to the duration of the operation.

To fulfil these indications, recourse must be had to an instrument so formed that it shall grasp the tooth alone, and by the required force applied nearly in the axis of the tooth, remove it. Such instruments are forceps; but forceps so constructed that they shall accurately fit the tooth to be extracted, and so fashioned at the jaws, nibs, or blades, that they shall readily separate the gum from the neck of the tooth, to which point they shall arrive by simply placing the extremities of the jaws at the edge of the gum, closing the handles, and at the same time pressing the instrument firmly and steadily in the direction of the tooth, till it comes in contact with the free edge of the alveolar process.

As the teeth are variously shaped, so will it be necessary to have forceps of different forms; in fact, a pair fitted to each kind of tooth. By forceps so constructed most teeth may be removed in less time than by any other tooth-extracting instrument at present in use; also with less pain to the patient, and without inflicting any farther injury to the gums and alveolar processes, than must necessarily result from the forcible separation of a tooth from its natural attachments.

An instrument which in its employment requires that force should be applied to the contiguous parts as well as to the tooth to be extracted, is an imperfect instrument for the required purpose; or an instrument which, by its form and mode of application, requires that greater force should be used than would be necessary for the dislodgment of the tooth, supposing that force to be applied in the most advantageous direction, is also an imperfect instrument, and but ill fitted for the purpose for which it was designed. Such, however, are the imperfections of an instrument till recently in very general use for the extraction of teeth—the "key;" in the application of which the fulcrum is rested on the alveolar process, between which and the fulcrum the interposed gum is subjected to considerable pressure: just as much, indeed, as may be necessary for the dislocation of the tooth. By this treatment the gum is often considerably bruised, sometimes so much so as to lead to suppuration of the injured part, and always to an unpleasant degree of

soreness. The force used in extracting a tooth with the key must be much greater than the actual force required to effect the operation, because the power is applied solely in a lateral direction—a direction in which the tooth offers great resistance, especially in molares of the lower jaw, where the lateral alveoli are strong, and composed of dense bone.

There are several specimens on the table of two and three teeth with their alveoli torn away from the jaw, in attempting to extract a single tooth with the key. These accidents could not have occurred had forceps been used.

I am quite aware that there are many and eminent surgeon-dentists who use and speak very highly of the "key" instrument; and no doubt it is very much to be preferred to the forceps which were ordinarily kept by surgical instrument makers: forceps applicable to no one tooth in particular, when applied touch only at two or three points, and are quite incapable of being passed down to the neck of the tooth, unless the gum be previously cut away, and even then very imperfectly.

Dr. Flagg of Boston, has contrived forceps for the extraction of every kind of tooth. I have not been able to get a sight of any of his instruments, but, from the description and plates given of them in Fitche's "System of Dental Surgery," I believe they are unlike those on the table.

A work entitled "Operations on the Teeth," by Mr. Snell, contains a description, with plates, of a form of forceps used by the author for the extraction of the molares. The principal aim of the inventor was to have two points of metal coming out from the edge of each jaw of the instrument; the object of these points being to be passed between the fangs of the teeth. These forceps admit of but very limited use, as the fangs of the molares, especially the second and third, are likely to be agglutinated; which condition, in each particular instance, is known only after the tooth has been extracted: but besides this, it is a matter of some difficulty, in any case, to get these two points between the fangs; and thereby inflicts unnecessary pain, supposing the tooth could have been removed without this violence.

In those instruments a point was made to project from the middle of the edge of the jaws, which, on grasping the tooth, should pass under the body of the crown and between the fangs. The forceps were unfitted for, and did not come into general use on two grounds: 1st. The fangs of the second and third molares are often united, in which case the point or points would be worse than useless; and we cannot know for certain the state of the fangs till the tooth has been removed. 2d. The insertion of the points is always attended with greater pain than results from seizing a tooth with adjusted forceps; and, excepting some cases which I shall afterwards describe, is attended with no compensating advantage.

All forceps whatever should embrace the tooth they are used to extract at its neck; the neck being situated between the termination of the enamel and the free edge of the alveoli, and covered by gum. In order to arrive at this part of the tooth without difficulty, or unnecessary pain to the patient, the jaws must present an inclined plane, terminating in an edge. The external surface of the jaws of the forceps, when closed, should present something like a cone, or parts of several cones, with the apex or apices cut off; and a perpendicular section should present an inclined plane, terminating in an edge, but more or less curved, as may be suitable to the particular instrument. The length from the joint to the edge of the jaws should on no account be greater than will be necessary to allow sufficient space for the reception of the crown and neck of the tooth, so that no strength may be lost.

An average tooth should be selected and given to the forceps-maker, and he should be instructed to make the jaws fit the neck of the tooth exactly, leaving sufficient room for the crown of the tooth to be free from pressure, but not more than will be necessary to clear the enamel.

The fangs of all teeth having a general conical form, forceps, when well made and applied, should be but as a lengthening of the cone towards its base. For removing teeth which are not decayed down to the gums, the ends of the jaws should be square or slightly rounded; but when nothing but the fang

remains of a tooth, rounded ends are the more convenient, as with that shape they are readily introduced between the fang and inclosing alveolus. Instruments for extracting stumps should be made altogether lighter, the jaws thin and sharp at their edges, so that they may be made to cut rather than tear the membrane connecting the fang with the adjoining tissues. But I shall say more on the extraction of stumps presently.

Forceps should be constructed and used upon the principle of lengthening the tooth for the extraction of which they are intended: thus enabling the operator to move it from side to side, or rotate it if the fang be single, and of a shape admitting of such motion.

After these lateral movements for destroying the membraneous union have been effected, the tooth may, unless the fangs have some peculiair position or shape, be raised in a perpendicular direction, leaving as little injury from its removal as the operation can admit.

When forceps are used for the extraction of teeth, the operation is divided into three stages—1st. The seizure of the tooth; 2d. The destruction of its membraneous connection with the socket; 3d. The removal of the tooth from the socket. When you commence operating, it will be of great service to you, and advantage to those operated on, that you should pay strict attention to these stages, and that each should be well and efficiently executed before you proceed to its successor; for, should the tooth be unskilfully seized, the crown will be broken off in the attempt to detach the tooth from the periosteum of the socket, until which is effected, the fangs cannot be removed from their bony cells. You will find that a tooth will resist a great force applied in a line with its axis, or, in other words, if you attempt to pull a tooth straight from its socket.

In seizing a tooth, the jaws should be closed lightly on the tooth, and inserted under the free edge of the gum, and then *forcibly* driven down to the edge of the alveoli, or even a short distance into them. I say forcibly, because all beginners, and even some practised in the use of forceps, are liable to failure because they do not use sufficient force: they seize the tooth

at the tooth at the edge of the gum, instead of at the edge of the alveoli.

I wish to impress upon you the absolute necessity of laying hold of the tooth as far down towards the fangs as you can possibly get the instrument. An old and successful operator, when instructing another in the use of forceps, said—"Push them into the sockets as though you intended they should come out at the top of the head, or under the chin."

The way of effecting the second stage will depend on the shape of the tooth to be removed; as also will the third, and to this we will now address ourselves. But different shaped teeth require forceps shaped to them. It will be necessary, therefore, to describe partially the teeth, and then the forceps individually, that the peculiar shape of each instrument may be understood. Before doing so, however, I should state that it is quite impossible for any person to extract teeth properly, whatever instrument may be used, especially if the forceps be chosen, unless the operator is perfectly acquainted with the form of each tooth, with the relative position and size of the fangs, with their direction in the alveoli, with the general form of the alveoli themselves, and with the directions in which they offer the greatest and the least resistance.

ARTICLE II.

Case of Spontaneous Destruction of the Alveoli of the Second Bicuspis and First Molaris. Reported by S. M. SHEPPARD, D. D. S., Petersburg, Va.

THE following case came under my observation in December, 1847, and, although I am unable to give a complete report of it, on account of its advanced state when first brought to my notice, still there may be facts connected with it worthy of record.

Mr. B., aged about 45, a farmer, consulted me in regard to an affection of the mouth, which first made its appearance about six months previous. I found, on examination, that the bicuspid and first superior molar, of the right side, had been removed, together with the gum and alveoli, up nearly upon a line with the termination of the roots of the teeth. The edges of the wound were somewhat reddish, not much inflamed, but no appearance of healing. I introduced a probe, which readily passed up into the antrum—the floor of that cavity having been entirely destroyed. The membrane of the cavity seemed to be in a healthy condition—judging from the fact, that no pain was occasioned by slight pressure upon it with the probe. The duct from the antrum to the nose was free, as was proved by forcing air through from one to the other; and fluids injected into the antrum, passed readily out at the nostril. To form a prognosis, I was dependent on the patient for a history of his own case up to this time. I was led to conclude from his physical condition, that the development of the affection of the mouth was the continuance rather than the beginning of disease. I learned, substantially, the following facts: About seventeen years ago, he had an attack of paralysis: from which, he only partially recovered. He was able, however, in some sort, to superintend his farm. His flesh wasted away, particularly from the left thigh and leg, leaving little else but skin and bone. He was a man of temperate habits; being an exemplary member of a christian church. He had a family also; a wife and four or five children. About six months previous to the time at which I was consulted, there was a feeling of tightness, and somewhat of numbness between the second superior bicuspid and first molar of the right side, which induced him to pick at it a good deal. It gave him little or no pain, and the gum had but little sensibility in it. In a few weeks the gum became hard and crust like, and began to slough; and as the alveoli became exposed they exfoliated. In a short time, by this process, the two teeth above named, became quite loose, and were removed. Hope was now entertained that the disease would be arrested; but

it still continued without abatement until a large portion of the roots of the adjoining teeth were uncovered. Alum and other astringents were used without any beneficial effect. Very little pain was experienced up to this time. Being unable to discover any local cause for this affection, I supposed that local treatment would continue to be unavailing; and by my advice, he placed himself under the medical care of one of our most skilful surgeons. By the request of the surgeon I subsequently extracted three other teeth, viz. the first bicuspid, and the two remaining molares. He remained under treatment about two weeks, perhaps three, during which time I saw him occasionally. Finding himself rapidly declining, he returned home, and died in a few days. It may be proper to remark, that his teeth were all sound; that he had not lost more than one or two previous to the loss of those above referred to; that there were no dead roots of teeth in any part of his mouth; that the part affected had never received injury from a blow, or other accident, so far as recollected. Those last removed have nothing peculiar about them; and so far as their attachment remained, it appeared natural on removal from their sockets.

ARTICLE III.

Reports in brief of four cases in Surgery, and one case in Obstetrics in which Chloroform was beneficially used. By M. Z. KREIDER, M. D., of Lancaster, Ohio.

CASE 1. Amputation of the right mamma for cancer in a married female, aged about thirty years.

The irritation produced by the chloroform about the mouth and nose in this case led me at once to doubt its purity. I afterwards found my suspicions to be well founded, that it did contain a small quantity of absolute alcohol. In my experiments I found that by dropping a small quantity into distilled

water in a thin glass vial, it became opaque—in other words the globule of chloroform seemed to become coated with a *milky pellicle*, which after a time disappeared. With pure chloroform this appearance never obtained.

These experiments were made about the middle of February, and before the publication of a like test in France.

The agent though not pure in this case, so far succeeded as to produce insensibility to pain during the operation.

Case 2. An old lady aged 56, suffering from false aneurism produced by wound in bleeding from the arm. Chloroform was administered in this case, producing the full anesthetic condition—the humeral artery was ligated and the patient speedily recovered.

Case 3. A boy aged four years suffering from paraphimosis of six days continuance. The parts were much inflamed, swollen and painful. Administered chloroform which produced insensibility to pain and made the necessary incision to relieve the *glans*. Patient recovered without an untoward symptom.

Case 4. A lady aged 30 years was suddenly attacked with a violent pain in the palm of the hand. The hand became turned, and the pain was so excruciating as to immediately threaten loss of life.

Chloroform was administered, an incision made down to the bone at the point where pain was first felt. The most marked and speedy relief followed and the lady recovered rapidly. The invasion in this case was undoubtedly erysipelatous.

Case 5. A lady in labor five days. Presentation of the left hip. Parts exceedingly swollen, dry and tender—abdomen also very tender to the touch, the consequence of long and severe uterine pain. Chloroform administered—feet brought down, and child delivered alive. Patient speedily recovered.

ARTICLE IV.

Neuralgia. Case of Miss E. R. L. By J. LEE, M. D., of Camden, S. C.

MISS L. spent the winter of 1836-'7 in Mobile and New Orleans; prolonged her residence until June, '37. Returning to South Carolina she was much exposed; several times wet; took severe cold; was attacked with neuralgic pains in the face; referred principally to the dens sapientiæ, inferior maxilla, right side. On examination I found two cavities not deep; I excavated and filled them; pain continued a week or ten days; I extracted the tooth; it came away easily; the tooth was not considered the cause of the pain, but it was crowded and could be well spared. The pain in the jaw increased. It was treated through the general system, and locally, by stimulants, galvanism, emollients, and as it manifested a periodicity of pain from bad to worse, it was treated with quinine, &c., &c. Nothing left undone from which hopes of benefit could be derived.

From November to January, 1838, scarce a night's rest was obtained; the whole system seemed to be giving way under intense suffering; the pain commenced at the right central incisor, and extended back to the angle of the jaw; the middle and upper branch of the nerve were only occasionally painful. At this stage of the disease she earnestly solicited the extraction of the teeth; this, of course, was refused. I proposed the examination of the first molar of that side which I had plugged with gold in 1832; removing the filling, I found the bottom of the cavity clean and white. I then drilled into the pulp, causing but little additional pain; the pulp was perfectly healthy. One-eighth grain of arsenic was placed in the cavity and covered with wax. At the expiration of two hours the pain began to diminish. That night she slept well. I renewed the arsenic, putting in half a grain and covered it with a tin filling. At the expiration of ten days I took out the tin, most of the arsenic had disappeared. The capsule of the tooth was very tender, being inflamed, as I suppose, from the absorption of the ar-

senic; this soreness continued more than a month. Three months have now elapsed since the operation. The neuralgic pain has not returned; the tooth has no sensibility. At present it has a tin filling.

ARTICLE V.

On the Management of Irregular Dentition. By J. B. MITCHELL, M. D., Surgeon Dentist.

IRREGULARITY of the second dentition, viewed in regard to its causes, is of two kinds: the one arising from a want of harmony between the development of the permanent set, and the decadence of the milk-teeth, the other depending on a defect in the correspondence which ought to exist between the growth of the jaws and the increased volume of the second series of teeth.

Little difference of opinion at present prevails on the subject of the first kind of irregularity, the interference of the dentist being now usually limited to assisting the ordinary course of dentition, when it is tardy or over active, but in no way anticipating the operations of nature. The profession is much indebted to M. Delabarre and Mr. Thomas Bell, for the improved views now so generally entertained in regard to the management of this particular defect of dentition. The same unanimity, with the exception of some matters of detail, may also be said to exist in respect to the regulation of the teeth, in cases where either kind of irregularity has been allowed to become permanent.

That species of irregular dentition, however, which depends on disproportion between the capacity of the jaws and the size of the teeth, forms the subject of several conflicting opinions. Two principal views have been taken by dentists, the distinguishing features of which are, on the one side, a tendency to

allow things to take their course until remedial measures are called for, and, on the other, a leaning to preventive means.

In the system which is based on the former view, reliance is almost exclusively placed on the natural expansion of the jaws during the second dentition—no decisive measure being adopted till after that period has elapsed, when, if room cannot be provided in the dental arch for the irregular teeth, by artificial means, they must be extracted. To convey a satisfactory idea of this system, I cannot do better than quote from the writings of some of its most eminent supporters. "When each tooth is only a little too large," says Delabarre, "we should, before employing the traction by threads, file between the several teeth: we may by this means obtain from the whole the space of a third or fourth of a tooth, which ordinarily is sufficient: but we should sooner sacrifice a tooth than cut the rest too much, when the size of these bones appears to be extraordinary, and, especially, if there exists the least defect in the conformation of the jaws. When the fault is very decided, I find it more prudent to remove the teeth out of the row than to attempt to bring them within the circle. However, we should never be in any haste to extract them, for the jaw sometimes increases when we least expect it, so that, instead of there being a sacrifice of several teeth which it was supposed would one day have to be removed, that of one only may be sufficient. While we are thus temporizing, therefore, we are only courting a favorable opportunity. It is consequently only after being perfectly satisfied that the teeth, which are badly arranged, can never be rectified, that I attempt to remove them; and I usually practise this operation about the age of twelve or thirteen, for then the anterior arch of the jaw is susceptible of but little increase. When the removal of some of the irregular teeth becomes necessary, there are some which we should extract in preference to others: thus, all dentists agree to sacrifice a lateral or central incisor which is wholly out of the row, and the same may be said of the canines, when in a similar position, unless the bicuspides be diseased." Mr. Bell to the same effect observes: "If the irregularity be very slight, and the want of space trifling, it will

be sufficient to pass a very thin file between several of the teeth, so as not to deprive any one of them of the whole thickness of the enamel, and in this way a considerable space will be gained by the approximation of all the teeth so treated, and the irregular tooth be brought into its place by moderate pressure; but, if the want of space be so great as to afford no hope of its being remedied by this mode, it often becomes necessary to sacrifice one of the permanent teeth. It cannot be too strongly insisted on, that sufficient time and every possible encouragement should be afforded to allow of the expansion of the maxillary arch, before either of these operations is had recourse to; and I have often had reason to congratulate myself upon the result of having refrained from employing them, until the age of fourteen or fifteen years should have decided whether they would be ultimately necessary; at which period the arch of the jaw has been found to have expanded sufficiently to admit the irregular tooth into its place. . . If after the lapse of that period, during which the expansion of the jaw may have been expected to take place, an inferior incisor should be forced much out of its situation, it will generally be necessary to remove the irregular tooth itself; after which the others will approximate so as to close the vacancy, provided the teeth of the upper jaw do not interfere with this process. In the upper jaw, however, the removal of a central incisor would be too great a sacrifice; and it never, or scarcely ever, happens that such a step can possibly be necessary. The loss of a bicuspid, or, at the worst, of a lateral incisor—the latter may almost always be avoided—will be found sufficient."

It will be readily admitted that the principles involved in the above treatment are tantamount to a total abandonment of preventive measures; and that the long delay which is recommended is equivalent to trusting to chance for the obviating of a defective arrangement, instead of adopting means to prevent it. The character of this plan becomes the more apparent when we consider that, by the study of the constitution and predisposition of the patient, we have it in our power to predict, with considerable accuracy, what will be the ultimate development of the parts.

The fundamental errors of this system are its temporising nature and the sacrifices that are entailed by the delaying of the treatment. In the first species of irregularity, this delay is rather to be commended than condemned, but, in that kind of irregularity which arises from disproportion between the size of the teeth and the development of the jaws, I should consider the sacrificing of one of the permanent incisor or canine teeth, as little better than no treatment at all, or at least not such as one would expect from the superintendence of a professional man.

It was Mr. Fox who first developed the principles of the preventive treatment in these cases, and the practice, as laid down by him, affords a very clear statement of the means of managing this species of irregular dentition. The following are his very practical remarks on this subject: "Irregularity is often occasioned by the teeth being much too large for the space allotted to them, and then it will be necessary to remove one or more of the permanent teeth. When the incisores are perfectly regular, and the bicuspides have appeared before the cuspidati, there is so little space left that the cuspidati are thrust too much forward. It has been the common practice to permit the cuspidati to grow down a certain length and then to extract them. This operation certainly removes the deformity of projecting teeth, but it destroys the symmetry of the mouth, and takes away two teeth of great importance. The cuspidati are exceedingly strong; they form the support of the front of the mouth, and in the advanced periods of life, to those persons who have the misfortune to lose the incisores, they furnish an excellent means of fixing artificial teeth: on these accounts they should be preserved, and therefore it will be right to extract the first bicuspides on each side. The cuspidati will then fall back into the circle, and if there should be any vacant space, it will be so far back that no defect will be perceived. The first permanent molares often become carious soon after they appear; when this is the case, and the other teeth have not proper room, considerable advantage always attends their extraction. Their removal permits the bicuspides

to fall back, and gives way for the regular position of the cuspidati. . . . If they be extracted before the second permanent molares appear, in a short time they will not be missed, because the bicuspides will go back, and the second and third molares will come forward, so that no space will be left. The front teeth may even derive much benefit from this gain of room as there will probably be left a small space between them, which will tend to their preservation; for it is observed, when teeth are situated so close as to press hard upon each other, they almost always fall into a state of decay."

Mr. Fox, then, is very decided as to the desirableness of providing space for the teeth in those cases where they are obviously disproportionate to the limited size of the jaws, by the removal of two or more of the back teeth, even should they be sound; and in this he is followed to a certain extent by Mr. Bell, who allows as we have seen above, that one, and even two bicuspides, may be removed for the purpose of making room, and further admits, that a decayed molar may sometimes be sacrificed to attain that object. He says: "As a general rule, it may be observed that in cases of the early decay of a first permanent molar, it will be proper to remove it if there should appear to be a want of room in the jaw, as the bicuspides will then be allowed to fall back and give sufficient space for the other teeth to come into their natural and regular situation. This, however, like all the other operations for remedying or preventing irregularity, should not be employed until the advance of the teeth in the front indicates an absolute tendency to an irregular position." The first sentence of this quotation is sound both in principle and practice, but it appears to me that what it does contain of good is almost neutralised by the closing caution, the only effect of which must be to render the measure in many cases nugatory. The case supposed is one in which there is crowding of the teeth from want of room in the jaw, and where the extraction of a decayed tooth would furnish the space required, if performed early enough. What must be the effects of delay in such a case till the teeth have actually made an abnormal advance in the front of the mouth? Clearly to

preserve in the jaw an unsound, and, therefore, injurious tooth, which must ultimately be lost, but whose removal, if effected in good time, would provide the additional accommodation necessary, and to run the risk when it is extracted, after the teeth have advanced in the front of the mouth, that the space will be left permanently vacant instead of being profitably occupied. M. Delabarre also admits the propriety of providing space by the extraction of a small grinder if diseased, and hints at the removal of even a sound bicuspid in preference to sacrificing an irregular canine tooth; but he denies that the removal of a large grinder, under any circumstances, can be of use in favoring the arrangement of a canine tooth. His words are: "We should generally prefer to remove even one of these (bicuspides) in order to make room for a canine tooth which we believe can be brought back with facility. The evulsion of a first great molar affected with caries appears to me to be but little capable of favoring the arrangement of a canine tooth, though it may be useful in assisting that of a tardy bicuspid." It may be said, then, that all agree that the cases are not of unfrequent occurrence which demand the sacrifice of one or other tooth for the sake of preventing irregularity, or of removing it when established: it is only as to which is the proper tooth to select for this purpose, that any difference of opinion prevails.

When any of the permanent teeth are in a state of decay at the time the operation is demanded, the indication is obvious enough: the diseased teeth ought to be extracted and the sound left, taking care, however, to attend to the effect on the symmetry of the mouth. In such a case it will almost invariably be the first molar that requires to be removed; as about the age when irregularity commonly occurs, it is exceedingly rare to find any other of the permanent teeth affected with caries.

It is when the teeth are all sound that there is room for diversity of opinion; under these circumstances, the almost universal practice is to remove the first or second bicuspides. "It was the custom before Mr. Fox's work appeared," says Mr. Bell, "to remove the irregular tooth itself; but as the in-

cisores and cuspidati are of far superior importance to the *bicuspides*, and as any partial vacancy which may remain is of much greater consequence near the front of the mouth than further back, it is much better, in all common cases, to sacrifice one of the *latter teeth.*" "When from the arrangement I am led to believe that a small gap must result from the indispensable sacrifice of a tooth, I prefer to remove the second *bicuspides*, to facilitate the placing of a canine." (Delabarre's Second Dentition.) "When extraction is necessary [to make room in the jaws,] the *bicuspides* are the teeth that should be selected for this purpose, and usually the second should be preferred to the first." (Dr. Arms, in *American Journal of Dental Surgery*, vol. v, p. 215.) "Whenever the space in the jaws appears too much confined, * * * one or more of the *bicuspides* may with incalculable advantage become a sacrifice." (Parmly's Lectures, p. 85.) "The teeth which are decayed should be extracted; but if all the dental organs are sound, we should remove the first *bicuspides.*" (Garriol on the Diseases of the Mouth, p. 112.)

Mr. Koecker is the only writer that I am acquainted with who advocates the extraction of the first large grinders in preference to the bicuspides or other teeth: this author has gone minutely into the subject, and his views are particularly worthy of attention. "Those teeth," says Mr. Koecker, in his "Principles of Dental Surgery," "which are most subject to decay, least important, and the removal of which would afford the most relief to the whole set, are the proper ones to be chosen for extraction. As the loss of the incisors and cuspidati greatly disfigures the set, they ought to be preserved if possible; and I have hardly ever seen a case in which it was necessary to extract any of them with the view to give room to the rest, where an early attention had been paid to the state of the teeth. The preservation of the bicuspides, also, should be a matter of particular consideration; and the usual practice of extracting the first bicuspid teeth, to make room for the cuspidati, ought to be avoided, as well as the removal of the lateral incisores, by an early treatment.

"The first molares are generally most predisposed to disease; they are least important as regards both appearance and utility, and so situated as to afford, by timely removal, sufficient room for the anterior teeth, as well as for the second and third molares. If these teeth are extracted at any period before the age of 12 years, all the anterior teeth will grow more or less back, and the second and third grinders so much towards the anterior part of the mouth as to fill up almost entirely the vacant spaces caused by the removal of the first molares. In almost every instance all irregularity will be prevented by this treatment, and all the teeth will take a proper position. But besides this advantage, another more important benefit will invariably follow, viz. all the teeth will be improved in strength and health, and particularly the *dentes sapientiæ*, which will sometimes penetrate the gums much sooner, and prove of larger size, and possessed of greater firmness than usual."

In order more fully to elucidate this subject, let us give an attentive consideration to the distinctive characteristics of the first permanent grinders. These teeth are the only ones of the second set in which ossification has commenced at the period of birth; they are, therefore, the first formed of all the adult teeth. At the age of twelve months the ossification of the first permanent molares is pretty well advanced, while the second molares are usually found as mere shells at the completion of the first dentition. Such a vast difference in the period of formation of the first and second molares is a remarkable circumstance; but if we turn our attention to the time of cutting of these teeth, we shall be still more struck with the individual peculiarities that are severally exhibited by them. While the second persistent grinders are not generally cut before the twelfth year, the first four grinders make their appearance about the age of six, before the milk-teeth begin to be shed; so that about twelve it is not unusual to meet with children who are furnished with twenty-four teeth, twenty of which, of course, are deciduous. This very early appearance of the first molares exercises considerable influences on their characters and constitution. Interposed, as it were, between the first and

second set of teeth, they would appear almost to occupy an intermediate place between the two series. On this account some have recognised in them an analogy to the wisdom-teeth, and have termed them the wise milk-teeth. In conformation and mode of growth the three persistent grinders agree; but in regard to the time of their appearance the greatest diversity exists. With no fewer than seven years between the ages when they appear, each of these three teeth may be said to belong to a distinct septenary period.

It is matter of every-day observation that the first molares, both in the upper and lower jaw, are the teeth which are most subject to decay: indeed, there are very few adults in whom they are perfectly sound; and in a large proportion of children above eleven, decay will be found to have commenced in them. The statistics of extraction furnish corresponding results. Mr. Tomes, in his Lectures, published in the Medical Gazette, states, that out of 1736 teeth extracted at the Middlesex Hospital, 642 were first molares, being no less than 36 per cent. It is also often remarked that these teeth, from their first appearance, are of a dull or slightly bluish color, very different from the complexion of healthy teeth, and uniformly indicative of incipient decay—an observation which Dr. Ashburner has had occasion to record in many of the cases of anormal development and crowding of the permanent teeth given in his very instructive work on Dentition, and which might also be extended to the wisdom-teeth. This defective constitution and predisposition to decay in the first molares may be readily accounted for by a reference to the comparatively early period of their formation, and their consequent exposure to the effects of those derangements of health which are so frequent in infancy, and especially during the first dentition, as well as from their being in the mouth during the whole time of the shedding of the temporary set, when they are almost certain to be neglected, if not injured, by being made to perform offices for which they are not calculated. M. Serres has noticed the influences which so specially bear on those teeth: "J'observerai, comme je l'ai deja dit, que toas les grands efforts portent sur les grosses molaires, et notamment sur la première.

These considerations ought to be sufficient to determine the extraction of the first molares in preference to all the other teeth, for the purpose of fulfilling the indication presented by the species of irregularity under discussion. But there is an additional reason for adopting this practice in the peculiar position the first molar teeth occupy. Situated in the centre of the half circumference of the jaw—which it ought never to be forgotten is composed of two symmetrical members—they hold a place between those permanent teeth that succeed the temporary set and those that are superadded, both of which series form foci of irregularity, tending, the one forwards from the first molar as a fixed point towards the front of the mouth, the others backwards, towards the ascending ramus of the jaw. That irregularity to which the latter—namely, the superadded grinders, are exposed, exhibits itself always at the period of the cutting of the wisdom-teeth, in the same manner that the irregularity of the former series, which the French happily enough denominate *dents de remplacement*, generally shows itself at the time the canine teeth appear. Anormal development of the wisdom-teeth, which depends on the want of space between the coronoid apophysis and the second large grinder, has attracted more attention from medical practitioners than that of the other teeth, on account of the sympathetic effects it gives rise to being very often of a violent and extraordinary character. Among Dr. Ashburner's cases are some very remarkable ones of this irregularity, and every practical dentist is well acquainted with its nature and effects. The usual practice in such cases is to remove the irregular teeth themselves when they can be laid hold of, and, failing in that, the second permanent grinders. But this will be found unnecessary if, in cases of want of consentaneous development between the teeth and jaws, the practice of Koecker be followed; for the extraction of the first molares gives relief both forwards and backwards, and when it is early had recourse to, the occurrence of irregularity will be entirely prevented, and the health of the wisdom-teeth guaranteed.

The truth of these remarks cannot be better illustrated than

by the following case from Dr. Ashburner's treatise: A shoemaker, aged 22, suffered from tic douloureux, stammering, and confusion of ideas, accompanied with obstinate constipation. "The jaws were small; the four last molares were wanting; the spaces for them were small. In the upper jaw the tubercles were prominent behind the second molares; in the lower jaw there was not room for the *dentes sapientiæ*. The first molar teeth had each specks in them, and were of a more blue tint than the others. With a conviction on my mind that this man was suffering from a retarded and obstructed development, I knew not how to afford him relief. If that part of each jaw which contained the germs of the wise teeth could grow faster, there would be room for the teeth to come through: but how was the tendency to growth to be given to them? Going into the country, where a pure air would invigorate him, and make him expand his frame, was out of the question. To give him iron and bark and other corroborants, in town, would do little good; but combined with an eccoprotic and alterative course, it was the only plan left: for to remove the four healthy teeth which prevented the egress of the wise teeth was an unwarrantable experiment. This man came backwards and forwards to me for several months. I varied his medicines: I gave him colchium with rhubarb, and directed him to sponge his body with warm vinegar. Nothing relieved him; and I lost sight of him for fifteen months. He had been in the neighborhood of Birmingham with some relations; he had gained flesh, and looked more healthy and had lost the tic and the twitchings. The jaw had increased, and he had cut the upper wisdom-teeth; but the lower ones were not through, there was still too small a space. He had suffered much from decayed teeth, and had had three drawn, and there were four decayed teeth and a stump still remaining. The pressure from behind in the lower jaw had wrought a remarkable change in the incisor teeth. When I first saw them they were even; now they were huddled together, and lapped over one another. Nature had in this case made greater havoc with the teeth than I should have done had I not regarded the removal of four healthy

teeth an experiment I had no right to make." (P. 143.) In this most instructive case there can be no doubt but that the timely removal of the four specked first molares would have effectually relieved the pressure both before and behind, and thus prevented the havoc which Dr. Ashburner, with so much ingenuousness, bewails; and that without the loss of a single sound tooth.

One other case from the same source I cannot refrain from citing. It is that of a girl aged 15, who had spasms of the muscles of the neck, and other nervous symptoms amounting almost to paralysis. (Dentition and some coincident Disorders, pp. 208-11.) "This young lady's teeth being very unusually large, and the jaws not growing with sufficient rapidity for the space required by the coming teeth, so much pressure operated to keep them back that they could not come through. Under the idea that the developing teeth, which appeared to be advancing most rapidly in the lower jaw, required space, the two second molares were extracted. The benefit was not striking, but a burning pain, and sense of weight on the top of the head, about the frontal and parietal bones, becoming very urgent, it was thought advisable, on the 16th of September, to remove the corresponding second molar teeth in the upper jaw. The operation was succeeded by immediate relief to the head, and a partial restoration of the power of moving the fingers of the left hand." The patient, however, did not at once get rid of all her painful symptoms, and Dr. Ashburner, with an impartiality which is as laudable as it is rare, closes the case with the following acknowledgment: "Had I been bold enough to sacrifice the four molar teeth which obstructed the development of the wise teeth at an earlier period, I feel convinced that I should have saved this young lady a world of pain and other evil." Undoubtedly such would have been the result, but it would have been preferable practice to extract the four first instead of the four second grinders.

I often meet with patients who, after having had one or more of the bicuspides removed to afford room in the jaw, have, a few years later, lost the first molares from caries; thus incur-

ring a double loss, which in all probability would have been prevented by sacrificing the large instead of the small grinders. It is not uncommon, also, to see adults in whom the wisdom-teeth are so much out of their natural position as to be entirely useless, while the vacant spaces left by the first molars, lost from decay, attest that if they had been extracted early, the wise teeth would have had room to grow forward; so that eight grinders would have been secured for use instead of only four or five, and no perceptible void left.

In deciding the question as to the sacrificing of the bicuspides or the first molares, it is not unimportant to recollect that about the time when it generally is desirable to perform the operation, the former have just appeared and are quite new teeth, whereas the latter have already been in use five or six years, and are, by that length of time, older teeth.

ARTICLE VI.

Operations on the Jaws, with the Results of Thirteen Cases. By PAUL F. EVE, M. D., Professor of Surgery in the Medical College of Georgia, Editor of the Southern Medical and Surgical Journal, &c.

CASE 1. *Fibrous Tumor attached to Superior Maxillary Bone, with Polypus of the Nose—Ligature to both Primitive Carotids, removal of Tumor—Recovery of Patient.*

IN July, 1835, I ligated the left carotid artery, removed a polypus from the left nostril, and dissected from the cheek of the same side, a fibrous tumor which was found attached to the outer surface of the left superior maxillary bone. This foreign growth had an osseous attachment, and was about the size of a guinea egg. The patient was a youth aged 18 years. His parents inhabited a sickly district of South Carolina, and had recently lost five children; this their last one was of a cachetic

habit. The polypus returned the next winter, and was removed a second time. In 1836, the patient visited New York to consult Dr. Mott, who ligated the right carotid. He is now a man of family, managing a large property. I saw him three years ago, and the only evidence remaining of disease about him, was a slight fulness in the left cheek. Twelve years have now elapsed, and he has experienced no unpleasant effects from the ligature to both primitive carotid arteries.

CASE 2.—*Removal of nearly the whole Right Superior Maxillary Bone for Polypus of the Antrum—Recovery of the Patient.*

May, 1836, Mr. J. S. aged 21, was operated upon the third time for a large fibrous polypus of the right antrum highmorianum. In two previous attempts the foreign growth had been attacked in the nostril, the antrum was opened, and the soft palate slit up, but without succeeding in its entire removal. In the third operation, a flap was made by two incisions through the cheek and lip, this reflected over the eye, the maxillary bone of the right side thus exposed was separated between its first and second incisor teeth, then the nasal process of the same bone divided transversely, after which the alveolar processes with six teeth (the wisdom tooth not being developed) was gradually detached. The palatine process of the superior maxilla, and the palatine plate of the palate bone were also removed, and as the fibrous tumor could not yet be pulled away, even by great force, it was separated by curved scissors from the basilar processes of the occipital and sphenoidal bones, and also from the internal plate of the pterygoid process. The mass removed weighed three ounces three and a half drachms. Three sutures were applied to the palate and five to the face in dressing the wound. The latter united, but the former did not. The patient entirely recovered: I have seen him several times since the operation, and believe he is still living in one of the upper counties of this state. (For further particulars, see Southern Medical and Surgical Journal, vol. i, first series, p. 78.)

CASE 3.—*Removal of* $4\frac{3}{4}$ *inches of the Inferior Maxillary Bone, including one of its angles, for Osteo-Sarcoma—the disease returned and destroyed life in about* 8 *months after the Operation.*

May 31st, 1838, I operated upon a negro woman, aged 25, for a tumor involving nearly the whole left half of the lower jaw-bone. She had had one child; the catamenia were now suppressed; for years she had been complaining from what was called jaw-ache; and the molar and bicuspid teeth of the diseased side had been extracted. While preparing the patient for it, the operation was hastened from impending suffocation. An incision was made perpendicularly from the left angle of the lips to the thyroid gland, and from this point another one extended to the lobe of the ear of the same side. Extracting the canine tooth of this side, the inferior maxilla was divided with a saw, and then by careful dissection, this portion of the bone was drawn outwards so as to apply the saw at its neck, leaving its condyle in the articulation. It measured 4 inches and $\frac{3}{4}$ in length; the diseased mass presented a large fungous growth containing numerous irregularly shaped spiculæ and laminæ of bone.

Three ligatures and some eight or ten sutures with the ordinary dressings were applied, and the patient returned home on the fortieth day after the operation. She, however, did not entirely recover; the disease reappeared in the right sub-maxillary gland, then invaded all the tissues, and destroyed life in about eight months. (For further particulars, see *Southern Med. and Surg. Journal*, 1st series, vol. ii, p. 720.)

CASE 4.—*Operation for Separating the Jaws—Success only Partial.*

Early in 1840, I made an attempt to re-open the mouth for the son of Mr. S., aged five years. He had had gangrænopsis, which had resulted not only in destruction of the soft parts but

ankylosis of the lower jaw. There was also great deformity of the mouth. After free division of the zygomatic muscles and other soft parts, the right commissure of the lip was depressed, and the separation of the lower jaw increased by the lever power. The patient, who was from the country was committed to his parents, with instructions how to treat the case. I frequently see him, now become quite a lad, and regret to add the deformity has only partially been remedied

Case 5.—*Fungous Hæmatodes involving the Jaws—Operation—Death of the Patient in a few months after it.*

In August, 1840, I made an incision into a tumor situated under the right masseter muscle and about the size of a common egg. The patient was the Rev. Mr. D. of South Carolina, aged about 40 years. The cause of his disease was quite obscure. When the opening was made, the finger soon turned out a considerable quantity of brain-like matter, mixed with blood, and the coronoid process of the right side of the inferior maxilla down to the angle of the bone was found perfectly denuded of its periosteum. The operation was now abandoned. An immense bloody tumor was rapidly developed on the side of the face, involving all the tissues, bleeding spontaneously, and death alone relieved the sufferer in about eight months from the operation.

Case 6.—*Removal of Portion of the Inferior Maxillary Bone for Epulis—Recovery of Patient.*

On the 7th of September, 1840, I operated upon Mrs. H. in Madison, Geo., for epulis of the lower jaw. Exposing the bone by an incision from the left angle of the mouth through the cheek to the extent of an inch and a half, the diseased mass was isolated by two perpendicular applications of the saw, and it was then chipped off with the chisel and mallet. This patient fully recovered.

CASE 7.—*Removal of nearly the Whole Right Superior Maxillary Bone for Fungous Hæmatodes of the Antrum, &c.—Return of the Disease and Death of the Patient in a few months.*

The 6th of February, 1842, I performed before the medical class of our college a similar operation to the one described in case 2. The patient was a negro man, aged 45 years. The disease was removed as far as could be traced, and was pronounced fungous hæmatodes or soft cancer. The patient so far recovered that he returned home in about a month, but his affection was rapidly reproduced, and he died in two or three months after the operation.

CASE 8.—*Operation for Separating the Jaws—Success only Partial.*

In 1843, I operated upon Dr. G. then a student of medicine, for deformity of the mouth and closure of the inferior jaw, said to be effects of cancrum oris, or of profuse salivation. The operation and its results were similar to case 4.

CASE 9.—*Trephining the Antrum Highmorianum—Death of Patient within fifty hours after the Operation.*

This case was a young lady, who for years had a tumor developing in her right cheek. Considering it the result of polypus of the antrum, the anterior surface of this cavity having been exposed, a trephine was applied and made to penetrate one inch and a half—the tumor, however, proved to be osseous. This was on the 12th of April, 1844. The operation was now abandoned; and the patient to our surprise, apparently doing well, died on the third day from symptoms of congestion, &c., of the brain. (For further particulars of this case, see *Southern Med. and Surg. Journal*, vol. iv, new series, p. 279.)

CASE 10.—*Removal of a Portion of both the Superior Maxillary Bones for Epulis—Recovery of Patient.*

Mrs. H. of South Carolina had been laboring for some years under a fungous growth from the alveolar processes of the upper jaw. It proceeded from carious teeth, some of which had been plugged and others had artificials inserted upon their stumps or roots. The tumor now extended to both of the superior maxillary bones. The diseased mass had once been removed by excision. On the 5th of July, 1845, I divided the gums both anteriorly and posteriorly to the foramen incissivum; then by extracting the first molar of one side and the canine tooth of the other, with saw, &c., the included portion of the bone was removed. The patient had a considerable hemorrhage during the evening after the operation; having been called into the country, another physician kindly arrested it by creosote. Mrs. H. left for home a week after the operation, and had a good recovery. A small tubercle subsequently presented itself, but was promptly repressed by caustic, and I believe she is still quite well.

CASE 11.—*Removal of a Portion of the Inferior Maxillary Bone for Osteo-Sarcoma—Recovery of Patient.*

Juno, a negro woman, aged 30 years, had carious teeth, and by the extraction of a molar tooth of the left side of the inferior maxilla, a portion of the alveolar was removed with it. She has continued to suffer pain in the jaw for some years past; and has had all the teeth of this side extracted. Eighteen months ago, a tumor began to be developed at the seat of pain, which was laid open by a physician. On the 14th of October, 1845, thinking it a case of epulis, the whole of the diseased mass was cut away, and as it began to be reproduced, I applied the actual cautery on six different occasions. The knife in removing the tumor had its edge fractured by coming in contact with spiculæ of bone which it contained. On the 16th of No-

vember same year, I divided the cheek from the left commissure of the mouth to near the angle of the lower jaw of the same side. This exposed the whole disease of the bone which when denuded was removed with the saw. The artery of the bone was found obliterated; a mere strip of its base remained undivided by the saw.

This patient had a good recovery; was presented to the class on the 23d, seven days after the operation, apparently cured; and returned home on the 25th. I saw Juno a year after the operation, and found her not only healthy and sound, but the mother of another infant.

CASE 12.—*Removal of Portion of the Inferior Maxillary Bone for Osteo-Sarcoma—Recovery of Patient.*

June 5th, 1846, I operated upon Mrs. D., in Decatur, Ga., for disease of the lower jaw-bone. It had been of some years standing, and involved the whole circumference of the bone. It was about the size of a turkey egg, its center occupying the right stomach tooth, and included the base of this bone. A plug of the inferior maxilla, about one inch and a half of its whole circumference was removed and contained thin spicula and lamina of osseous structure. This patient had a good recovery, and continues well at present.

CASE 13.—*Operation to Separate the Jaws—Failure.*

In 1846, Mrs. W., of South Carolina, applied to have her mouth re-opened, and a large circular opening closed in her left cheek. The deformity was attributed to profuse salivation. Slitting the left commissure of the mouth, a lever was applied upon the lower jaw, but no force exercised could start the bone at its articulation. The portion of the alveolar holding the inferior incisor teeth upon which the lever was applied was even fractured. The incision of the soft parts was then extended to the coronoid process, and the saw applied to it, but again without success in separating the jaw. A ledge of bone, or a co-

alescing of the coronoid process to the malar bone seemed to have been produced or to have occurred in this case. Closing the opening in the cheek, Dr. Mott's instrument for separating the jaws was furnished the patient, and after a few days she returned home. I have since learned that she has not been much benefited by the operation.

In four of the above cases the operation was limited to the superior maxillary bone, in four others to the inferior maxilla, and in the five remaining it included both of the jaw-bones. In one, death occurred within three days after the operation, and in three others the patients only partially recovered from the disease—not one dying from the effects of the operative procedure in itself.

I am now engaged with a case requiring operation upon the jaws.

ARTICLE VII.

A Thesis on Tic Douloureux, or Neuralgia Faciei. Presented to the Faculty of the Baltimore College of Dental Surgery, by John McCalla, of Philadelphia, for the Degree of Doctor of Dental Surgery. Feb. 4, 1848.

The affection commonly called tic douloureux, or neuralgia, has its seat in the branches of those nerves that are distributed over the cheek, namely, the fifth and seventh pair of nerves, at the same time that no nerve in any part of the body is exempt from its attack, yet the fifth pair, or trifacial, seems to have been chosen as its favorite seat.

Proceeding as it does from that remarkable plexus which is bathed, as it were, in the blood of the cavernous sinus, and the branches of it passing through bony structures; the second and third, especially, being enveloped in bone to a great

extent; it is, probably, from one or other of these anatomical circumstances, or from both of them combined, that the pain derives its peculiar character.

Its mode of attack differs in almost every case; in some the paroxysm commences with a dull obtuse pain not unlike an incipient tooth-ache, or some of the affections of the maxillary sinus, exciting at first, perhaps, little attention or alarm; gradually, however, it becomes more severe, and of more frequent recurrence, accompanied by acute, darting, plunging pains, shooting through the nerve affected, and the different branches of that nerve, with electrical rapidity, occasionally ceasing for a few moments as if for the purpose of rallying its scattered forces to renew the attack with redoubled energy; in this manner the unfortunate sufferer is thrown, as it were, into a state of frenzy. After having continued in this way for some time, the pain gradually subsides and the violent flashes cease for the time.

The pain attacks other persons suddenly and without warning, with an intensity of suffering which it is difficult to describe. In some cases the pain is characterised by a sensation of clawing and gnawing in the affected part, or as if a red hot iron was forcibly driven through the nerve, and accompanied by a repetition of agonizing shocks or flashes darting through it. The termination of the paroxysm is often as abrupt as the attack, whilst it leaves the patient either in a high state of nervous excitement, or completely exhausted by the agony. Sometimes the paroxysms intermit for the space of three or four days, or a week, or even a longer period, at other times they will return irregularly, several times in a day, setting at naught all prognosis, and obeying no regular laws; those that come on suddenly and violently from the first, are frequently the most severe, irregular and obstinate.

Cases are occasionally met with in which the paroxysms return three or four times every day in quite as regular order, as to the time, as they do in cases partaking of a more common or quotidian type. In others, again, two, three, or even four weeks may intervene between the paroxysms, yet the recurrence of them is so regular that the exact day on which they will

return can be generally foretold. There is also a marked tendency in this disease to return annually about the same period. This is equally true of both forms, the regular and irregular. Some individuals assert that they suffer most in October and November, and others in April and May.

Tic douloureux in many of its phenomena is very analogous to epilepsy, hysteria, and other nervous diseases. In neuralgia, as in epilepsy, the parts are sometimes quiet, as, indeed, the whole system may be; yet there is so great a tendency to it that the slightest cause is sufficient to provoke an attack. Again, in neuralgia as in epilepsy the patient is occasionally forewarned of the approaching paroxysm by a feeling somewhat similar to the epileptic aura. We have heard of a case in which the paroxysm was invariably preceded by a sensation, as if a fine thread passed from about the region of the pylorus, through the chest and neck, to the seat of the pain in the cheek, and as soon as it reached that spot, the pain in the cheek began. Others have remarked that for some time previous to an attack, they invariably perceived a degree of nervous restlessness and irritability of temper, which rendered them unfit for any occupation either of business or pleasure, and made the society of their friends a burden to them. This state of feeling has been found to exist in cases depending on a disordered stomach. Among the various causes giving rise to this painful malady may be enumerated, dyspepsia, disease of the brain, disorder of the uterus, congestion of the liver and other viscera, morbid action of the spine, malaria. Local mechanical causes give rise to it, and in some persons there is found a constitution occasioning a neuralgic habit. Such, for example, are persons of a nervous and irritable disposition, who are morbidly sensitive to every impression both moral and physical, and on whom impressions produce more than ordinary corresponding effects. This extreme sensibility of the nervous system is found more frequently in females than males, and does not appear to arise so much from the irritation of any particular nerve, as from a peculiar idiosyncrasy. If, at any time, the feeble powers of such an one be further weakened by disease, an attack of pain

having all the characteristics of true neuralgia will be the consequence.

We have thought proper thus to enumerate some of the causes of neuralgia, as well as the phenomena attending the disease, more for the purpose of showing the intimate relations existing between different and remote parts of the system, than from a desire to point out any particular mode of medical treatment. Our object at present is to consider some of the local mechanical causes giving rise to neuralgia, and endeavor to point out some of the surgical means to be employed in removing those causes.

Under the head of mechanical causes, or local irritation, may be mentioned, tumors growing in the tract of nerves, irritation of nerves from foreign substances, local injuries of nerves, exostosis, &c. The difficulty and embarrassment which have attended the diagnosis and treatment of these affections, have arisen principally from mistaken views of their pathology. They have too often been regarded as actual diseases of those nervous filaments which are the immediate seat of the neuralgia, instead of being considered as symptomatic of disease in the larger nervous masses from which those filaments are derived. This has given rise to the practice of dividing the second branch of the fifth pair of nerves where it passes out of the infra-orbiter foramen on the face, an operation which has deservedly gone into disrepute, as it is now generally admitted, that disease of the larger nervous masses, as the brain and spinal marrow, is not so much evinced by phenomena in the immediate seat of the disease, as in those more remote parts to which the nerves arising from the diseased portion are disturbed. That pain should be excited in nerves by irritation caused by tumors is not extraordinary; but it is difficult to account for pain in one nerve when another is irritated, in any other way than by the innumerable branches running in all directions, forming plexuses, and giving and receiving filaments from other aud remote branches. That such is the case there can be no doubt, as the following example will serve to show: it is the case of Lord ——, taken from the "Dublin Medical Press," reported by Sir

J. Murry, who states "that there was no symptom of tic douloureux for more than a year after the amputation of a leg, and not until the stump was injured by its being struck violently against a post, which produced excessive pain at the time and subsequently exfoliation of bone, since that time it appears the extremity of the nerve has become more irritable, and this has produced great constitutional irritation and disorder, which have apparently caused and kept up neuralgic pain in the cheek."

Several cases have been published of neuralgia arising from the encroachment of tumors on the course of nerves. When the tumor is large it cannot well escape detection, but occasionally it is so small as to be unnoticed by a careless observer, as is shown in the following case. Miss S. D. had been subject to neuralgia in the lower jaw for two years. When a physician was first called in, he found her considerably out of health and exhausted; the menstrual functions were performed regularly, although the secretion was of a pale dirty color. Having some defective teeth on the painful side of the face, they were removed with temporary relief. She was subsequently treated with tonics, and among others she took arsenic, which lessened the duration, but not regularity of the pain. On combing her hair she discovered a tender spot, which when pressed rather sharply gave her one of the severest attacks of pain in the jaw. On examination a tumor was found about the size of a horse-bean, situated on the parietal bone; pressure was again repeatedly tried and always produced the same severe pain; the tumor was removed with permanent relief, and speedy return to health.

Some persons have an extraordinary disposition to encysted tumors. Upwards of twenty have been met with in the same patient. The scalp seems more especially the seat of the atheromatous kind. These tumors are not painful, they are generally loosely situated just below the skin, and grow if left alone (particularly the steatomatous) to an enormous size. It is always best to extirpate them, as a troublesome sore is often the result of any attempt to promote suppuration. This operation may

be performed by making an incision through the skin in the direction of the muscular fibres across the tumor and carefully dissecting it out. When the contents are of a fluid character, the yielding and floating condition of the walls of the cyst render the dissection very difficult. At this stage of the operation it has been recommended to open the cyst at its most depending part and expel its contents, after which the walls being in a collapsed condition may be more readily removed by the knife; the vessels supplying the tumor usually enter it at one point, and to prevent excessive hemorrhage may be reserved for the last stroke of the knife. They should now be taken up and secured by ligature, the coagulum removed, and the edges of the wound brought together and united by sutures or adhesive plaster, and then properly bandaged; the dressings to remain for several days. When the tumor is large, the double elliptical incision is indicated, as by this means we are enabled to remove a portion of the integuments which facilitates the operation, and cicatrization goes on more readily than when a redundance of integument is left.

Neuralgia has been known to follow the prick of a gooseberry thorn, attacking the patient with nervous symptoms, and impairing the general health which was only relieved by the amputation of the finger. In another instance neuralgia was cured by the removal of a fragment of china which had been lodged in the cheek for fourteen years.

The disease known as exostosis has long been classed among those giving rise to neuralgic affections, it is a bony excrescence or tumor growing out of, or upon, some part of a bone in consequence of an inflammatory action set up in the investing membrane. The morbid growth may arise, first from an osseous deposition seated between the external surface of the bone, and the internal surface of the periosteum, and adherent to both; secondly, from a similar formation originating in the medullary or lining membrane, and cancellated structure of a bone. Besides those just mentioned, Sir A. Cooper, describes two others, the cartilaginous, and the fungous exostosis; the first where the enlargement is preceded by the formation of

cartilage, which forms the nidus for the ossific deposit; the second where the tumor is softer than cartilage, yet firmer than fungus in other parts of the body, containing spiculæ of bone. It is usually known as osteo-sarcoma. That this disease sometimes depends upon local irritation there can be no doubt, as we have on record several well authenticated cases of osteo-sarcoma of the maxillary bones, which were completely cured by the extraction of the neighboring teeth and the subsequent exfoliation of a portion of the bone, and alveolar processes; the great majority of cases, however, will be found to depend upon some constitutional taint, and then we have little to hope for from any mode of treatment that may be adopted: even amputation is no certain cure, as the disease is liable to occur in another situation.

An exostosis when not very large, causes but little inconvenience, but when it has extended itself, the surrounding soft parts become affected, the muscles stretched, the cellular substance thickened, and the functions of the nerves and arteries interrupted; in short, wherever these enlargements occur in the neighborhood of important organs, and increase to any size, a loss of power must be experienced in their functions; when this disease occurs in the teeth it is always on the roots, and in some cases where the growth is not rapid, it may exist for considerable length without causing the patient much uneasiness. As the fang becomes enlarged, however, the patient experiences a dull continued pain in the affected tooth, yet probably not so severe as to determine him upon its extraction, but when the deposition of bone is more rapid, or the walls of the alveolus less yielding, the pain is more acute and lancinating, resembling that of tic douloureux. The pain now extends, not only to the contiguous teeth, but to the jaw, cheek, and forehead, shooting along the different branches of the fifth pair of nerves with the rapidity of lightning. This is frequently so intense as to mask the immediate cause of it, and render its discovery exceedingly difficult; in forming a diagnosis it will be necessary to examine the teeth carefully, which may be done by striking the tooth or teeth suspected, with the handle of an instrument.

As the investing membrane will be found very much inflamed and highly sensitive, a blow given upon the side of the tooth on which the disease is situated will be followed by severe pain and thus discover the seat and nature of the disease. It may exist when the crowns are healthy, but it more frequently manifests itself upon subjects whose teeth have become painful, either from indolent inflammation, caused by the decay of the body of the tooth, and which extends even to the roots, or the result of a gouty or rheumatic diathesis. Numerous cases of neuralgia of the face have occurred, which, resisting for a length of time the usual constitutional remedies, have been traced to this source and immediately relieved. In dental exostosis nothing remains to be done but the extraction of such teeth as are affected, and the sooner this is done after it has been discovered to exist, the better, for although the alveolar cavity may increase in size as the osseous formation progresses, the opening toward the gum is seldom, if ever, enlarged so as to admit of the extraction of the tooth with facility. To render the operation more safe, the gum should be freely dissected away from the tooth by making a vertical incision through it and dissecting it back to each side. The portion of alveolus in connection with the exostosed fang may now be removed, which will afford an easy exit for the tooth and render the liability to fracture the jaw, much less than when such precautions are omitted.

The treatment of tic douloureux must differ as widely in different cases as the causes that give rise to it. In those cases in which the disease assumes the intermittent type, it can be relieved, as all other cases of intermittent and periodical disease, by the exhibition of quinine, or arsenic. If the pain can be traced to an impaired state of the digestive organs, a course of medicine calculated to restore them to a healthy condition is clearly indicated. When neuralgic symptoms can be traced to a morbid state of some portion of the spinal marrow, the treatment consists in local depletion by leeching or cupping, and counter irritation by blisters to the affected portion of the spine, and in very obstinate cases issues or setons have been used with decided advantage.

Baron Larrey, surgeon general to the army of Napoleon, recommends the moxa in neuralgic affections of a chronic character; he says, "when convulsive and habitual motions of certain muscles (which characterise tic douloureux) have become chronic, whatever may be the cause; or are the result of a mechanical cause, which weakens the tissue of the nerves of the muscles, the moxa is perfectly indicated; but it should be applied as near as possible to the seat of the disease, and upon the course of the injured nerves. The lesion consists in the chronic engorgement and inflammation of the membrane which invests the nerves of the affected part. This remedy, by producing an excitation upon these organs, causes a salutary derivation of the morbid principle, and re-establishes a healthy action.

"It is not equally indicated in acute neuralgia, proceeding from spontaneous causes, nor in tetanic affections, because it augments the irritation and tetanus."

When neuralgia faciei depends on some peculiarity of constitution, the pains arise spontaneously as it were, whenever the system is reduced to a state of general debility; in others in whom this morbid state is not so highly developed, yet exists to an extent sufficient to predispose them to these pains, it requires only a very trifling cause of irritation, or a temporary or slight derangement of the general health to produce them.

The nature and peculiarity of each case must be carefully studied and treated accordingly, bearing in mind that females of such habits are incapable of enduring harsh or violent remedies, but that a steady and patient perseverance with mild ones is necessary until a more healthy action is induced, then by a cautious use of tonics combined with sedatives, and a proper attention to regimen, the general health may be so improved that the neuralgic habit will at length, to a certain extent, be overcome.

ARTICLE VIII.

The following cases are reported in the *London Lancet* as having occurred at the Middlesex Hospital.

Fracture of the Nasal Bones.

The nose, from its exposed position, is not unfrequently injured by blows or falls, the cartilages being separated from the bones, or the bones themselves fractured. Although fracture of the nasal bones, being necessarily the result of direct violence, is generally attended by considerable tumefaction and disfigurement from effusion of blood, it is seldom that any serious consequences result from such an accident. Occasionally, however, it happens, that blows on this organ, which may perhaps have occasioned but slight external injury, are followed by symptoms indicative of inflammation of the brain or its investing membranes. This arises from the connection between the septum of the nose and that portion of the floor of the skull formed by the cribriform plate of the ethmoid bone. A blow on the nose may force up the septum, and fracture this delicate plate of bone. The possibility of such an occurrence is alluded to by most systematic writers on surgery, but is usually spoken of rather as an accident which might happen, than as one which is likely to be met with in practice. Within the last few months, four cases of injury of the face, with fracture of the nasal bones, have been admitted into the Middlesex Hospital. Three of these cases have terminated fatally, from inflammation of the membranes of the brain; and in all three there was found fracture of the cribriform plate of the ethmoid. In two of these fatal cases, the visible injury done to the nose was so trifling, that fracture of the ossa nasi was not suspected during life. The danger in these cases is not to be estimated by the amount of external injury. It is dependent, not on the degree of force producing the injury, but on the direction in in which that force is applied. The nose may be completely

crushed by a blow acting laterally or from above, and the cribriform plate escape uninjured; but a much slighter blow, so applied as to drive the septum directly upwards, may fracture the cribriform plate from which it depends, and the result may be death from inflammation of the membranes of the brain. It is probable that accidents of this kind are much more frequent than is generally suspected, as, from the nature of the lesion, it is very likely to be overlooked in the hurried manner in which post-mortem examinations are frequently conducted.

The cases are related in the order in which they occurred.

Fracture of the Nasal Bones, and of the Cribriform Plate of the Ethmoid; Inflammation of the Membranes of the Brain; Death.

CASE 1. J. T——, a stableman, aged thirty, of intemperate habits, was admitted late on the evening of the 15th of December, having just before been kicked in the face by a horse. He walked as steadily and answered as rationally as could be expected of a man who had evidently been drinking pretty freely. He had a vertical, irregular, lacerated wound, completely dividing the upper lip on the left side, and over the frontal sinus, a little to the left of the median line, was a cut about an inch in length; the bone beneath was denuded, and a portion of it driven in and partially detached, so as to admit the point of the little finger. No other injury, with the exception of some apparently slight bruises, was detected at this time. The patient, who seemed somewhat flushed and excited, apparently from drink, was sent to bed, the wound in the lip united by a suture, water-dressing applied to the forehead, and he was ordered a full dose of calomel and jalap. On the following day he complained much of pain in the head, which was still unrelieved on the 17th, although the bowels had been freely opened. The face was now much swollen, but without any redness, the skin being unusually pale. The eyelids were completely closed from œdema. Ordered two grains of calomel every six hours.

Dec. 18th.—Still complains of pain in the head, but the face is less swollen. About the middle of the day he began to talk incoherently, and attempted to get out of bed; towards night he became worse, being more muddled and confused, and his pulse, which had been quick, was now slow, but with some degree of power, and very irregular, both in time and force. He was at this time perfectly quiet, lying on his back. It was observed, that the right hand, which had been raised from the bed to admiit of the pulse being felt, retained its position after the support of the surgeon's hand had been withdrawn. The arm was now fully extended; it retained its position. The left arm was now tried; it also retained any position it was made to assume. Both arms were kept elevated and fully extended, for some minutes, in various positions, no attempt being made by the patient, whe remained perfectly passive during these experiments, to move the limbs; but after a time he drew his arms under the clothes, and curled himself up in the bed, in the position of a patient with concussion of the brain. During the time the arms were extended, there were slight convulsive twitches of the muscles. As the motions were reported to have been extremely dark and offensive, and as there was considerable power in the pulse, a strong dose of purgative medicine was ordered immediately.

19th.—He had not slept, and had been very restless, rambling a good deal, and frequently attempting to get out of bed. The bowels had acted freely, and the motions were more natural in appearance. He was in the morning much clearer in his intellect, answering questions quite rationally. The pulse was again regular, but weak. Omit calomel. To take porter and beef-tea. Towards the evening the delirium returned, and he became so noisy and troublesome, that it was necessary to remove him from the ward into a private room. At 11 P. M. he was bathed in a most profuse sweat; his face colored, but not flushed; his breathing short and hurried; his pulse excessively quick and feeble; his tongue dry, and coated with reddish-brown fur. He was incessantly talking, but scarcely made any attempts to get out of bed. As, from the present symptoms

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and the previous history of the patient, this was considered as a pure case of delirium tremens, he was ordered a pint of porter, with half a drachm of the liquor opii Indiensis, (Jeremie's solution of opium,) which, after a good deal of persuasion, he swallowed. No effect appears to have been produced by this dose; he continued talking during the remainder of the night, and until about 7 o'clock on the following morning, when he became much quieter, and in about half an hour after expired; four days and a half after the accident, and about forty hours after the first appearance of delirium.

21st.—The body was examined thirty hours after death. The face was considerably discolored from bruises. On reflecting back the skin covering the upper part of the face, a small portion of bone was found driven in over the frontal sinus, on the left side, corresponding to the wound in the integument. A small quantity of sero-purulent fluid was found in the cavity of the arachnoid. Beneath the arachnoid, which was thickened and opaque, was a purulent deposit covering the entire surface of the brain and cerebellum. The substance of the brain was healthy, but more than usually vascular; the veins on its surface were extremely tortuous. On removing the dura mater, the cribriform plate of the ethmoid bone was found to be fractured and driven up, and a fissure extended backwards through the sphenoid bone to the right anterior clinoid process. The ossa nasi being now examined were found to be both fractured. This had not been discovered during life. The viscera of the chest and abdomen were not examined.

Fracture of the Ossa Nasi, with Considerable Contusion—Recovery.

CASE 2.—W. H. B——, a cabman, aged about 30; admitted Dec. 24th. Had been laid up for several weeks with some disease of his chest. The first day he resumed his work, he was thrown from his seat, and fell on his face. There was no wound, but the face was much bruised, particularly about the nose, which was greatly swollen and discolored. On

taking hold of the nose, it was found to be perfectly movable, the movements being accompanied by distinct crepitus. Although the bony supports of the nose were so extensively fractured, there was but little displacement, and nothing required to be done to maintain the parts in a proper position. The patient was kept in bed on low diet, and cold lotion was applied to the face. No unfavorable symptoms occurred; the swelling gradually subsided, and he was discharged a few weeks afterwards, retaining but slight traces of the accident. This case, which may be taken as an example of the ordinary fracture of the ossa nasi, is recorded, from its affording an instructing contrast with the previous one. In Case 1, the apparent injury done to the nose was so slight as to escape detection during life; but the force, though producing such slight external injury, has been so applied as to drive up the bony septum of the nose, and break in fragments the delicate plate of bone which separates the cavity of the nose from the membrane of the brain. In Case 2, the visible injury was considerable, but was confined to the vault of the nose, and the accident was followed by no symptoms indicative of internal injury. The septum either yielded, or the force was not applied in such a direction as to drive it up against the cribriform plate.

Lacerated Wounds of the Face and Scalp—Extensive Fracture of the Bones of the Face—Fracture of the Cribriform Plate of the Ethmoid—Death.

Case 3.—A powerful muscular man, aged 54, was brought to the hospital, February 25th, at 5 P. M. He had been riding on the shaft of his cart, close by the hospital, but being drunk, he had slipped off, and the wheel of the cart, from the statement of those who accompanied him, passed over his head. He did not appear to be at all stunned, or to suffer any pain or inconvenience, and walked with a firm step from the surgery into the ward. On examination, it was found that there was a semilunar flap of scalp, about four inches across, torn up on the upper part of the head, a small portion of bone being di-

vested of its periosteum. There was a lacerated wound on each side of the median line, over the root of the nose. The wound on the right side, much the largest, extended down to the bone, exposing the margin of the orbit, and was prolonged to the free border of the upper eyelid, dividing, however, merely the skin covering the lid. The point of the finger introduced into this wound could be passed out into the orbit beneath the roof, which was divested of its periosteum. The eye was not burst, but blood appeared effused in its interior, and the sight was destroyed. The wound on the left side, at the inner extremity of the brow, was much less extensive, but extended to the bone, which was felt to be fractured into the frontal sinus. On the left cheek there was an irregular cut along the center, and another straight cut extended along the line of junction between the nose and the cheek. There was also a deep cut at the lower part of the wing of the nose on the same side. The ossa nasi and the ascending portions of the superior maxillary bones were felt to be fractured. The flap of scalp, which bled but little, was easily brought into position, and retained by strapping. The wounds on the face were united by sutures, and lint, dipped in cold water, was kept continually applied to the face. The oozing of blood from the numerous wounds was for some hours very considerable—a good deal passed backwards into the mouth; but by continuing the application of cold, it was, about 4 P. M., completely checked.

Feb. 26th.—Doing well; no bleeding; no complaint of pain; pulse rather thick; thirsty. Ordered an aperient, to be followed by salines, with antimony.

27th.—Passed a good night; slight symptoms of erysipelas appeared about the face; pulse much weaker. Omit salines; wine, four ounces; beef-tea. In the evening much the same; but complained of pain in the right shoulder. Had not previously complained of pain there, or, indeed, anywhere else. The shoulder was examined; but no bruise or other injury was detected.

28th.—Appeared going on very favorably during the day, and when visited late at night, was sleeping soundly, but he

had been dull, and had not spoken during the evening. About two A. M. on the following morning, a change suddenly took place; he woke up, and his breathing became very laborious, noisy, and hurried, each inspiration being accompanied by a loud snorting sound. It was difficult to make out the seat of this first sound, and impediment to the entrance of air. At first, it was conjectured that the larynx was the part in fault, but on raising the patient up in bed, so as to place him nearly in the sitting posture, his breathing became much freer, and less hurried, and it was now found, that the noise during inspiration was in a great part occasioned by the air passing through the wound over the left brow, during the respiratory movements, the nose being probably closed by clotted blood. On holding a candle near the wound, which communicated with the frontal sinus, the flame was observed to be drawn towards the wound in inspiration, and during expiration the air rushed out with such force as nearly to extinguish the light. At this time, he appeared perfectly insensible, and incapable of speaking. Although he was kept supported in the same position, the difficulty of breathing again came on in the course of a few hours; he became gradually weaker, and died at half-past 7 A. M., about five hours after he was first siezed with difficulty of breathing, and three days and a half after the accident.

Examination of the body, thirty hours after death. Head: The nasal bones, the nasal spine of the frontal, and the ascending processes of the superior maxillary bones, were broken across and driven downwards, so as to completely detach them from the frontal bone. On the right side, the external angular process of the frontal bone was broken off; the malar bone completely separated; and the zygoma fractured. The soft parts were much contused, with considerable effusion of blood, particularly into the substance of the right temporal muscle. The flap of the scalp was not united, but there was pus between it and the bone. There was considerable vascularity of the whole surface of the membranes of the brain, with slight extravasations of blood, especially on the inferior surface of both the cerebrum and cerebellum. Yellow, fetid pus was spread

over the surface of the arachnoid, covering the right hemisphere; and greenish colored lymph was found in the pia mater, beneath the arachnoid, on the left side. The brain was firm and vascular; a moderate quantity of clear serum was contained in the ventricles. On removing the dura mater, which was entire, the cribriform plate of the ethmoid was found to be completely shattered. *Neck:* A considerable extravasation of blood was found in the cellular tissue beneath the skin, on the anterior and right side of the neck, extending inwards to the root of the tongue. The larynx, trachea, and œsophagus, appeared quite healthy. *Thorax:* Heart and pericardium quite healthy; right lung much congested, and œdematous; left lung united to the walls of the chest by numerous old adhesions; the lower lobe breaking down under the fingers in the attempt to remove it; its tissues much softened, infiltrated with dark blood, and very fetid; in a state of incipient gangrene; it floated in water. This condition was confined to the lower lobe; the upper appeared healthy. On examining the right shoulder, where he complained of pain on the evening of the 27th, no external mark of injury was observed; but pus was found in considerable quantity in the bursa beneath the deltoid, extending down over the long head of the biceps, but external to the proper sheath; there was no pus in the cavity of the joint. The left shoulder and both knee-joints were examined, but they appeared quite healthy. The viscera of the abdomen were also quite healthy.

Fracture of the Nasal Bones and of the Cribriform Plate of the Ethmoid Bone; Inflammation of the Membranes of the Brain; Death.

CASE 4. Thomas T——, aged forty-eight, came to the hospital in the afternoon of March 22nd, stating that he had just before fallen from a height of eight or ten feet. There was some ecchymosis around the left eye, and a small lacerated wound over the margin of the orbit, but no fracture could be felt. As he was said to have been stunned for some minutes

after he fell, he was, as a measure of precaution, taken into the hospital, although at the time of his admission there were no symptoms indicative of any injury to the brain. At night he complained of pain in the chest, and of some difficulty in breathing, but this he stated to be a complaint he had been subject to for years. He was ordered a dose of calomel and colocynth.

On the following morning, the 23d, there did not appear to be much the matter with him, but about the middle of the day he complained of feeling cold and chilly, and the nurse gave him an additional blanket; soon after this a great change took place in his appearance, his countenance became vacant and void of expression, and his breathing hurried; he could not speak, and there was a slight twist of the mouth. To take calomel, six grains; colocynth, ten grains; to be cupped on the temples to ten ounces. At night appeared to have derived no relief from the cupping; was sitting up in bed; countenance still vacant, but there was no paralysis; he took no notice when spoken to, and did not attempt to speak; pupils not dilated, but insensible; pulse feeble, skin perspiring. A turpentine injection was ordered. A catheter was introduced, and a considerable quantity of urine drawn off.

24th. No great change appeared to have taken place. He still continued sitting up in bed, not speaking, and taking no notice of anything passing around him; the pupils rather dilated; the pulse very feeble and rather quick: he was sick occasionally in the course of the day; there was no paralysis, but some degree of rigidity in the right arm; the catheter was still required. The head was shaved and a blister applied to the vortex. As there was great difficulty in getting him to swallow any medicine, some croton oil was given him on a little sugar. He continued getting gradually weaker, without any marked change of symptoms, until half-past three A. M. on the morning of the 25th, when he expired, sixty hours after the accident. According to the nurse's account, he "died very hard," struggling a good deal, and foaming at the mouth.

Examination of the Body eleven hours after Death.—There was no injury of the scalp or of the vault of the skull; no injury

of the frontal bone beneath the wound. On removing the dura mater, lymph was found in large quantity spread over the whole upper surface of the brain beneath the arachnoid. On cutting into the brain, which was rather less firm than natural, pinkish in color, and very vascular, the lymph was found to dip in between the convolutions. A small portion of the substance of the brain at the posterior part of the right hemisphere, the point opposite to the wound on the left brow, was bruised and infiltrated with blood. The ventricles were filled with a considerable quantity of yellowish serum, containing numerous floating flocculi. The lining membrane of the ventricles was much injected. On removing the brain, a large quantity of sero-purulent fluid was found in the base of the skull. The medulla oblongata was very soft. There was a slight effusion of blood over the whole of the inferior surface of the left hemisphere. Puriform lymph thickly covered the whole of the inferior surface of the cerebellum, and was slightly spread over its superior surface. On removing the dura mater, there was found fracture of the cribriform plate of the ethmoid, and of the adjoining parts of the frontal bone. The fracture extended backwards through the anterior part of the sphenoid to its body. On reflecting the skin covering the root of the nose, the ossa nasi were found broken across at the upper part; and on pushing the nose upwards, the movement was communicated through the septum to the fractured cribriform plate. There was extensive emphysema of both lungs; the other viscera were healthy.

ARTICLE IX.

Attraction of Cohesion in Gold Fillings. By J. W. CRANE, M. D., Dentist, New York.

ALTHOUGH much has been said and written on the subject of filling teeth, yet there is room for argument and instruction for all. When a tooth is well filled, we must admit that the cavity

is perfectly dry, free from decay, and will continue so, under ordinary circumstances, for a number of years. But the manner of accomplishing this, has been a subject of discussion among the most respectable members of the dental profession. It is not necessary to enumerate the various modes of performing this operation, but we may safely say that each one thinks his own way the best, or he would relinquish it and adopt another. There is a test on almost every subject, by which we may arrive at the truth, and if one can be discovered, well adapted to this subject, we shall not hesitate to apply it.

There is one point concerning a gold filling, which is beyond controversy, and that is, a perfect solid mass of gold, well adapted to every part of the cavity, so that air and water are entirely excluded, is the most valuable filling. If gold in a fusible state could be poured into the cavity of a tooth, we should conclude that all the little irregularities would be filled much more perfectly than they could be in the ordinary way. All kinds of metal in a solid state are said to remain so by the attraction of cohesion. Earthy matter is capable of being kept together by the same principle.

But, since gold cannot be used in a fusible state, the question is, can we produce this attraction by any mechanical power. Philosophy teaches us, that if two pieces of metal are made to touch each other, they will unite by the attraction of cohesion. It also teaches, that if a vapor passes between them, at the time they are supposed to be in contact, they do not touch each other.

Take for example two pieces of lead, and cut a clean surface on each, and press them hard together with a slight turn, and you will unite them so that it will require considerable force to separate them. But if you pass your finger over the surface of either, or breathe on them, the attractive power is destroyed. Now I propose to show that this power has been applied to the operation of filling teeth, and is practicable in all cases where repulsion can be overcome.

It may not be so perfect in all parts, as that which is produced by fusion, but I am credibly informed that the same mass if melted, would fill the same space, because one is annealed, and the other hardened.

To accomplish this, it is necessary to cut through the filling in every direction, and the surfaces thus cut, united by the power of the wedge. To prevent any delay, (after the cavity is perfectly cleansed,) the gold should be slightly twisted into a cord or thread of sufficient length to fill the tooth, and taken up with the point of the instrument as it is wanted, taking care that no moisture or even the breath shall come in contact with the gold.

In 1829, I commenced filling teeth on the above mentioned plan, with a spring tempered excavator, and the only difficulty attending the operation has been to overcome the power of repulsion. The filling instruments should be curved and straight so as to cut in every direction, and should be kept sharp like the excavator, and should be spring temper, firmly fixed in handles. They should be thrust deep into the gold, carrying in a quantity of the metal at every thrust, until the cavity is more than full. The filling forceps, file, burnisher, &c. will complete the operation.

ARTICLE X.

Letter from G. F. J. Colburn, *Newark, N. J.*

Dr. Harris:—

Dear Sir:—Soon after the introduction of chloroform into this country, I discovered it would *readily dissolve gutta percha;* forming a solution, which with the addition of a few drops of spirits turpentine, possessed considerable adhesiveness and became solid after a short exposure to the air, as well as being perfectly impervious to moisture and not injured by the atmosphere or acids. As this solution possessed such peculiar properties, the idea suggested itself of applying it for dental purposes—such as cementing plaster *casts* when broken, coating pivots and the surfaces of the root when inserting a pivot tooth, in order to shield the junction of the parts from the moisture and secretions of the mouth, &c.

I have used the preparation in numerous cases for the above

purposes, also, for checking hemorrhage about the gums and mouth, and as a dressing for small incisions, and abrasions, &c. about the hands, and found it to answer an admirable purpose in all cases; for such uses I would recommend it to your notice. I send you some of the gutta percha, which you can dissolve by placing it in a bottle and adding chloroform to it—say four parts of the chloroform to one of spirits turpentine; the bottle should have a ground stopple to prevent the evaporation of the solvents.

I hope you will give this solution a trial, and if it should answer a good purpose, make it known to the profession through the medium of your journal.

Miscellaneous Notices.

American Society of Dental Surgeons.—Before another number of the the Journal will have been issued, this Association will have held its Ninth Annual Meeting, and we trust the proceedings on the occasion will be both interesting and instructive to the members who may be present, and that it may be well attended. From the proceedings of the last meeting, we have reason to believe, that the next will have a more practical bearing than any of the preceding ones, and we feel assured that it will, if the Committee on Practical Dentistry discharge its duties in a manner we have a right to expect from the well known abilities of the gentlemen who compose it. The improvements constantly being made in Practical Dentistry, afford ample material for an elaborate and interesting report, and we trust that the members of the Society have aided the Committee, by furnishing it with such contributions as they have had it in their power to make. Without such co-operation on thier part, it will not be expected that the Committee will be able to make as full a report as they otherwise would.

But apart from the report of this Committee, the whole of the first day of the next meeting of the Society is to be devoted to an interchange of views, on one of the most important operations in Dental Surgery, namely: filling teeth, and in the discussion of the subject, the experience and opinions of the different members will doubtless be elicited, both with regard to the indications for, and the manner of, performing it. We hope, therefore, that the meeting may be well attended, and that all who

go, may do so with the expectation, both of profiting and being profited. Every one who goes, should be prompted by either one or both of these motives—to be either teacher or pupil, or both. As he may freely receive whatever information may be communicated, let him also freely impart. And in seeking a high standard of practical excellence, let no one overlook the importance of a thorough theoretical knowledge of every thing connected, either remotely or immediately, with this department of medico-chirurgical science.

Finally, as the insignia of the Society is a polyandrian column, based upon a rock, and surmonted by the lamp of science, let the members, actuated by one common feeling, unitedly contribute, to the utmost of their abilities, to build it up so firmly upon the rock of scientific truth, that the lashings of the waves of envy and discontent, shall be able to make no impression upon it.

American Medical Association.—The following are the officers and standing committees for the present year:—

President.—Dr. A. H. Stevens, of N. Y.

Vice-presidents.—Drs. John C. Warren, Mass., Samuel Jackson, Pa., W. M. Awl, Ohio, and Paul F. Eve, Ga.

Secretaries.—Drs. Alfred Stille, Pa., and H. I. Bowditch, Mass.

Treasurer.—Dr. Isaac Hays, Pa.

Committee of Arrangements.—Dr. Jacob Bigelow, *Chairman.*—Drs. E. Hale, Z. B. Adams, J. C. Dalton, John Ware, O. W. Holmes, and H. I. Bowditch, Boston.

Committee on Medical Sciences.—Dr. L. P. Yandell, Ky., *Chairman.*—Drs. S. M. Smith, Columbus, O., J. F. White, Cin., E. S. Carr, Vt., Samuel Jackson, (late of Northumberland,) Pa., G. S. Upshur, Va., and S. H. Harris. Tenn.

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The next meeting of the Association will be held in Boston, on the first Tuesday in May.—*American Journal Medical Science.*

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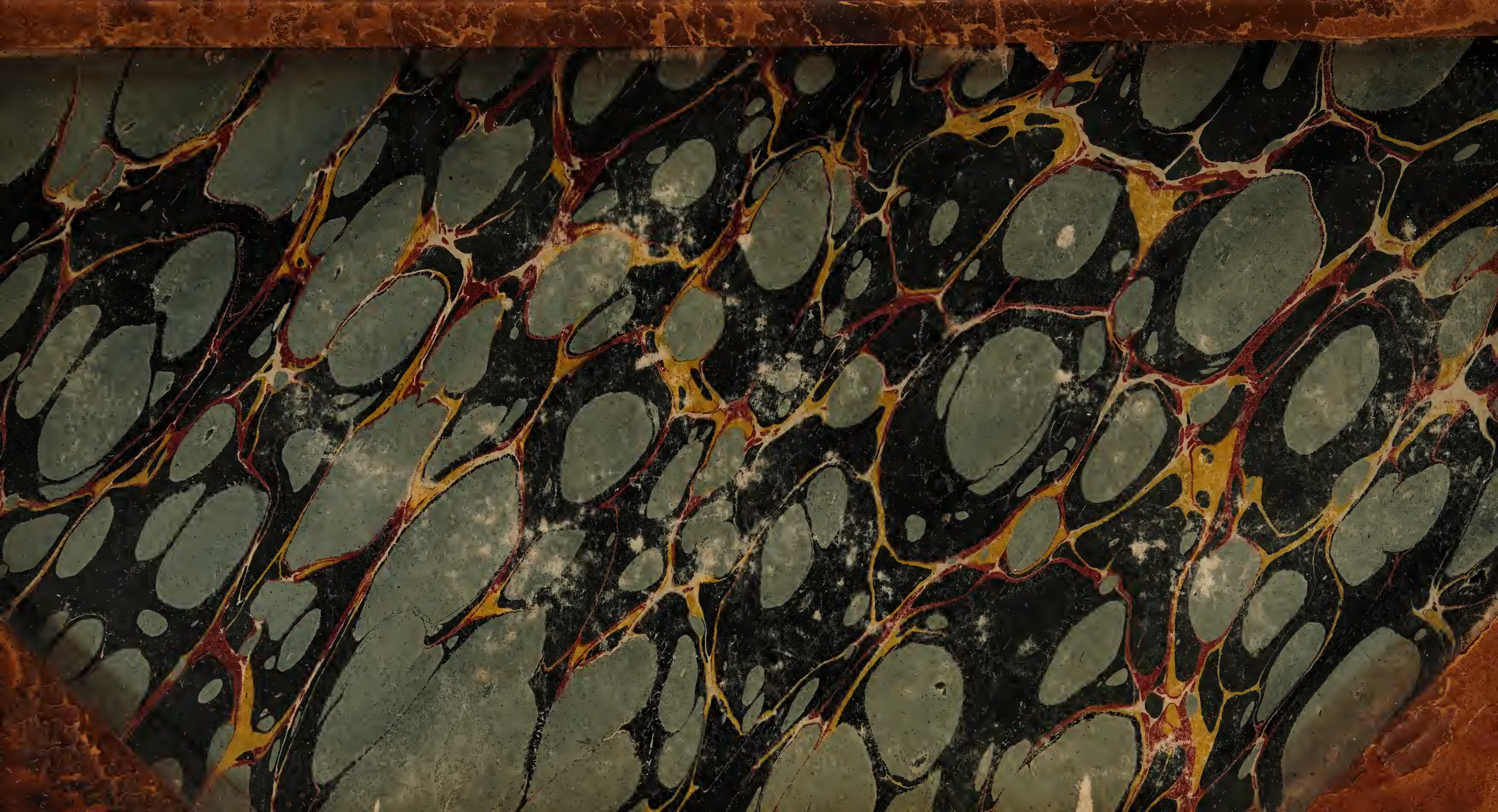
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